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MEDICINE & HISTORY

Series V Volume VI N° 1 March 1984

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TRANSACTIONS & STUDIES

of

THE COLLEGE OF PHYSICIANS
OF PHILADELPHIA

MEDICINE & HISTORY

Series V Volume VI No 1 March 1984

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The Japanese Watch Syndrome—What is Technology For, Anyway?

GEORGE SHEEHAN

SUMMARY: A physician's view of a patient and a patient's view of himself have lately been too often reduced to a series of instrument readings. This has led to a disturbed notion of wholeness, or health, and a diminished respect for the body's ability to speak for itself. These can be renewed by a less mechanical approach to sick people and, for patient and healer alike, greater enjoyment of life and rewards of play.

THE changing face of medicine is evident in the fact that I am speaking to you tonight. When I went to medical school, my father was a clinical professor of medicine—in those days there was no other type of professor of medicine. The only people who worked full time in the medical school were those in the basic sciences; everyone else worked with patients during the day. Unfortunately, we surrendered the medical school to the academics, and they kept choosing people in their own image. Medicine has changed from the time of my father, and I was reminded of him today because of the death of Dr. John Knowles. I was reminded not only because they died of the same disease—cancer of the pancreas—but also because Dr. Knowles was the *future* of American medicine. He was a man who believed in the private individual's efforts in the face of the avarice, ignorance, and expediency of the medical profession.

I present here something that Dr. Knowles always spoke about—the responsibility of the patient for his health. Health is something that you cannot give anyone. It is like truth. You have to build your own truth, and you have to build your own health. Unfortunately, we are all too eager to dispense health when we can. Dr. Knowles at one point said that we had reached the limit of what we can do with machines and drugs and that we now have to appeal to the patient to accept responsibility.

Dr. Sheehan is an internist, practicing and running in Red Bank, New Jersey. His talk was presented at College Night on March 7, 1979.

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Responsibility implies hearing and responding to something. So, patients have to respond to something they hear, but unfortunately most do not hear anything. We have not been clued into the fact that the body tells us so many things. Let us take, for example, perceived exertion, one of the most liberating ideas in physiology. When I first read about perceived exertion, I thought, "why are they spending so much time on this? It has no practical value." Then it became apparent to me that this phenomenon is probably the most important thing that you can tell an individual about his body—that the body knows what it is doing. Can you imagine that? You do not have to use a machine to tell you what is happening. This reliance on technology is what I call the Japanese Watch Syndrome.

Fifteen years ago I had a standard wristwatch. While I was raking leaves one day, I lost it. A great believer in signs, I never wore a watch again and I have never raked leaves since. But when I was in Dallas last year I met a friend, a jeweler, who said, "You don't have a watch?"

And I said, "No, and I don't plan to have one."

He took his off his wrist and gave it to me, and that is the only reason I took it. It is hard to argue with a man who hands you a $300 watch.

In any case, this watch could do anything. It had a stopwatch, an alarm clock, and the date.

I said to my friend, "It's a great watch, but the date—that's silly. All that circuitry to put the date in it. I *know* the date."

These days, I no longer know the date; the watch knows the date.

And it is the same with everything we do. If you interpose a machine between you and your faculty to do something, you lose that skill. When I do stress tests, I do not tell people how fast to run or how fast to jog. I say, "Consult your body, your best physician."

Galen, the physician for Marcus Aurelius, once said that handball is the best exercise of all. But he could not put into words the speed at which you should play it. You have to find out for yourself. That is what perceived exertion is.

The best single test of what the body is doing is to ask it. Is that easy? Is that hard? You should make a training pace comfortable, somewhere between the extremes. When I do a stress test on a patient to determine optimum running rate, we are in a comfortable room at 70° F and 40% humidity. The patient, who has been instructed not to eat, is usually interested in the procedure—it can be fun. But if after the test I prescribe a particular rate of running to an individual, it may have

no relation to reality when that person goes home and goes out to run. Perhaps now it is 80° F and 80% humidity. Perhaps the runner has forgotten about not eating, has a stomach full of food, and has had an argument with the spouse before leaving: "You're nuts going out there." Now the eight-minute mile that I prescribed is too strenuous, and a comfortable pace is twelve minutes a mile. The runner has to find that comfortable pace. Doctors have to get out of the way and let people discover what is right for themselves.

We are, in essence, teachers. And we are also artists. We help in the science—we teach people how to attain health. We have to do that as an art because, as we know, we are dealing with a laboratory animal that under precisely controlled conditions will do exactly as he pleases.

I do not know how long I was in practice before I found out how little people would do just because it was good for them. I had all the answers, but no one would accept them. "I've got to be cured," people said, "without giving up my butts or my booze or whatever."

People need to know that it is not hard to give up a thing if they know they do not need it anymore. What you as a teacher have to find for them is something that results in their not needing it anymore. In other words, you have got to find something positive, instead of the *don'ts* that we have been giving patients. What is happening to this odd group of people who are running on the roads and who are gradually getting healthier and healthier, who are giving up cigarettes without being told to, who are losing weight, whose blood pressures are dropping, whose pulses are getting slower, whose high density lipids are going out of the range? All the things we wanted patients to do, they are doing. But why are they doing that?

We live in a culture that treats the body as a second-class citizen. We are split off from our bodies—the church tells us the body is bad (we have to save our soul); school cares about our I.Q. or P.S.A.T. tests; industry classifies us as either a blue-collar worker or a white-collar worker. The body is being degraded constantly. Yet we are our bodies, and our bodies are us. This is the only life we are going to live. We live it physically, and we should live it at the top of our powers for our own enjoyment. The task is to find out what is a joyful experience.

Before I started running, I was falling asleep every weekend in front of the TV. But when I started to run, all my bad habits automatically left. What really happens when we start this type of exercise is that each of us becomes an athlete—someone who makes the most out of his

genetic endowment by training in the environment. That is what every doctor should try to instill in his patients, the attitude of getting the most out of what we were born with regardless of whether we are quite up to being Joe Namath or O. J. Simpson or whomever.

Like King David, we are marvelously made. Man at any age is still a marvel of the universe; when one becomes an athlete he puts age aside. He no longer ages, he grows. It does not matter what age he is—I am 60 and growing. The growth starts out with fitness and then develops into meditation and contemplation on the run.

When we run, we become an experiment of one. We begin to set our own rules, and we begin to think for ourselves—that is what an athlete learns. Running also begins to shape your whole life. It gets inside of your existence so that the entire waking day has to do in some way with being a runner. I am a runner-doctor, a runner-father, a runner-husband, and I am the better for it because now I have physical energy and creative energy and spiritual energy, too.

Most importantly, the runner achieves a sense of *play* in his exercise. What I and other runners have found is that that is the secret—a successful fitness program is one that is play. It is something you would do anyway. It is something that has its own meaning and is an end in itself. That is what running is.

A lot of people say that runners are selfish and solitary. They say that we revel in our loneliness, and that our self-confidence and self-image are just the opposite to that commitment to the race that we should have. But when we start to run, we begin to follow the advice: "Be first a good animal." When we begin to be able to move well, we feel at home with ourselves—we become that animal. There are very few people that feel at home in what they do. The ones that do, and who show it to others, are mostly athletes. They are comfortable with their physical selves, they occupy the right amount of space and move economically, and they have physical, creative, and spiritual energy.

We can suppose that energy comes from other places and that we can summon it through force of will, but Plato said that the body is the source of all energy. The Greeks educated the body with the mind. They were the aristocrats, and we can become the new aristocrats.

What happens to aristocrats? The Greeks went to the gymnasium and the palestra every day. They trained the body and believed in the harmony of the body and mind. That is what we are seeing today—new

aristocrats in sweat suits, who are developing that harmony between their body and mind. In the process they are doing everything we should encourage them to do.

Some doctors say that jogging is bad, and few runners will go to a doctor now who is not also a runner. But doctors are not the greatest detractors of running. Those who have done the most harm to those advocating exercise for the improvement of well-being were Descartes and Aristotle.

Descartes separated the body and mind, and as doctors, we accepted that idea. We treat the body as a machine. Although we have been taught to treat the whole patient, we do not. When I was a resident at King County Hospital, I picked up the chart from a patient's bed, went to the window, reviewed the chart and tests, ordered a few more, and replaced the chart in its holder. I did not even know if the patient was in the bed, but my Chief, Martin Murphy, caught me and verbally whaled the tar out of me. I deserved it. Too often we never look at patients; we treat test results.

Later in my career, I was invited to talk at the University Hour at the Kansas City Medical School. When I arrived at the lecture hall, there were about twelve people in the back row. The fellow who invited me took me up front and started to wire me with a lot of gadgets.

I said, "What's going on?"

He said, "Every student has a TV set. You're going to be on TV and they can watch you that way if they want to."

I got steadily more incensed during the talk. They were willing to accept the *image* of me on the TV; they did not want to see anybody in person.

Soon, the patient would be on TV, plus his tests. The doctor does not have to touch his patients, he only needs the technological means to reach them. By presenting the body as a machine, Descartes encouraged this detachment. Now we are trying to bring the body and its needs back into conjunction with mental attitudes.

Another stumbling block is rooted in Aristotelian logic. Aristotle said that things either were or they were not. For example, one is either a success or a failure. But who decides, and what has happened to gradations? Everyone is a success. One can be a failure sometimes and still end up as a success.

Aristotelian logic does not always apply to the real world. Many things that are important have very little to do with reason and logic. Often when we are most comfortable with ourselves we are dispensing with reason and logic, looking at things a little differently, not being in the status quo, and refusing to accept standard judgments as reality. That is the way we should be living, for each of our lives is a unique event. We are no more alike than our fingerprints. And we cannot judge our success by criteria developed by others. We must find our own pace for our own bodies.

All you have to do to find your own body is to use it, but runners found that everything we had used as normal in medicine had to do with spectators, none of it had to do with fitness. One investigator, on noticing that all the studies on aging were not related to fitness, went to a retirement community and recruited about seventy men for his own study. He put them on an hour's program that improved their capacity for physical work from twenty-five to forty percent. He also found that at age sixty-nine a man can improve his capacity for work by the same percentage as if he were twenty-five. The human body, the common, garden-variety human body, is the wonder of the world no matter what age it is. The standards for judgment must change.

People run, no matter what age, for the sense of general well-being that they achieve. But they also adopt a life-style consistent with health and productivity. This occurs more or less spontaneously. Their coronary risk factors automatically improve. Runners forty and over show that they have same lipid profile as a young woman—triglycerides down, cholesterol down, high density lipids up. They do not smoke, but they do drink, however. About thirty percent of them have three or four drinks a day. So apparently the body does not want to smoke but it will drink. If urged to, we will take a drink. But they had gone from smoking three packs a day to nothing at all. And, of course, everybody's losing weight. When I started at age forty-five I was playing squash and in excellent health at 160 pounds. Now I weigh 136 pounds, my weight when I graduated from school.

We do not care about the argument that running is going to make us live longer. John Knowles died at age fifty-two. He had a full life, and he lived right up to the last day—that is the point. Running makes every day that a full one. We should live every day as if it were our last. Runners develop that feeling called by Erikson *ego integrity*, a feeling that "I have lived the only life cycle possible to me. I have lived

that life I was supposed to." That is what it comes down to, a feeling of comfort. You have to have a sense of humor, to love what you're doing and the people you do it with, and you have to be fit.

Are you that perfect you in physical terms? We know that perfection mentally or spiritually is very hard to define. But perfection physically, to be the best you can be, is not that difficult. You must reach this perfection through play. Play does not have to be "fun and games." Many elements of play have to do with hardship, pain, and suffering. But we are in a civilization that says we should be avoiding pain. Nevertheless, there are people who in their course of exercise are seeking pain. Some have said, "the strenuous life tastes better," and the modern-day aristocrat has to go out and look for that. Only three percent of Americans have jobs that keep them fit, so they have to go out and find stressful exercise.

One of the things that occurs in exercise and sports is the development of character. I see character developing very rapidly in runners, marvelous people who were not marvelous when they started. Like everyone else, they had the basic neurotic tendency of wanting something for nothing. An athlete soon finds that this is an impossibility, and the patient should discover this also. The sedentary individual with hypertension has thirty or forty percent of his physiology available that he can go out and get—no one can give it to him. In the process of losing weight and stopping intake of salt, it may suddenly occur to him that he does not need any treatment at all. The "hypertension industry" is based on the fact that we lock a patient into his disability, but the cure lies in giving the patient responsibility. A cure can be found if the patient is motivated. So what are we doing? Why are we not giving the patient that opportunity to find himself?

When patients *do* get in touch with their bodies, they soon find that they are no longer exercising just to get rid of their disorders. That becomes a bonus. In order to appreciate this we must understand the definition of play. Play is something that has meaning but no purpose. Conversely, almost all training in physical education was just the opposite—it was something that had purpose but no meaning. We should have learned a long time ago that we cannot interest people in doing things on the basis of longevity or any other carrot. The only way we interest them is to revive in them that spirit of play.

Next we need to know the psychology of play and how to fit one's play to one's temperament and body. There is something that your

body does best. Some people have a natural strength and ability in action, and they love that. Other people are aquatic animals. Still others have protection against heat and cold; they are well insulated and they can do things in cold weather. Some people who tend to be a little bit round and heavy and have a layer of fat are not strong and do not perform well in endurance sports, so they need gadgets—bikes and skates and skis.

Another consideration for choosing one's play is temperament. I am a loner, so whatever I do I should do alone. Other people are extroverts. Their play has to include people. They want a lonely jog in the woods with twenty other people. Some extroverts want to go into action, they have to have something to hit, so they work on Kung Fu or lifting weights. What you have to find is play that fits your body and your temperment.

When you find it, you become a comfortable person. In play you also find humor and creativity and religion, because play has to do with all those things. Freud said that a normal individual should be able to work and love, but play is the key to everything. If you have work that has no play in it, it is labor. But if your work is play it becomes a craft. It becomes, in fact, a profession, because that is the way you witness yourself. We want to be able to say that what we are doing is worth our life to do. We want to do something that *is* that, that play, so that we *make* that work the way we profess ourselves. Sex without play is just lust, but sex with play is what love is all about. And religion without play is simply rules, but religion with play, with *that* play, becomes the way we enter the Kingdom.

So that is what running is about. Those people are playing. They are finding that their actions create an attitude that transforms their life. It is something we should try to introduce to our patients.

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Starvation In Children

MYRON WINICK

SUMMARY: Children starved during the first 18 months of life suffer growth stunting and damage to the brain and lungs. Corresponding changes can readily be induced in experimental animals. The extent and reversibility of tissue damage depend on the time of insult and can be modified by extra-nutritional factors in the environment. There is strong evidence that a child deprived of good nutrition and a stimulating environment could develop subsequent behavioral disorders.

STARVATION has been, and even today continues to be, one of the most serious problems that society faces. It is particularly serious in children, because in our society it affects them more often than it affects adults and it has unique consequences, some of which may very well be permanent.

Severe starvation takes on two forms in children. The first, called in Africa *kwashiorker*, is shown in the child in Figure 1. Swollen with edema, he also has a skin rash and certain other characteristics of the disease. One cannot see from the picture that the child is irritated and irritable. In addition, such a child has a blonding or reddening of the hair. All children with kwashiorkor show one other characteristic—they do not grow normally. They will grow very poorly or not at all.

In Figure 2 we see a child with the other form of malnutrition, *marasmus*. This child, who simply appears emaciated, is the victim of the most common cause of death in children in the world today. It is estimated that close to 300,000 people in the world have survived a bout of severe malnutrition early in childhood. But that is only the top of the iceberg, because in fact millions and perhaps hundreds of millions of children have suffered much less severe malnutrition. Even subclinical malnutrition can cause profound growth failure. Genetic differences can explain variation in population height, but these differences do not manifest themselves until after puberty. Children

Dr. Winick is Director, Center for Nutrition, Geriatrics, and Human Development, at the College of Physicians and Surgeons in New York. This paper was a presentation at College Night, October 5, 1983.

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Figure 1. Child with kwashiorkor.

from villages in which severe malnutrition is rampant suffer from profound malnutrition during their early life and show the effects of stunting which may, in fact, be permanent.

The simplest way to identify a child as having malnutrition in a country where it occurs is to measure how much that child's growth has been stunted. This knowledge is not new. However, what was not known until the 1950s was what happened *after* the malnutrition was relieved and the child was rehabilitated. Before this time there were two schools of thought, one claiming that children who were severely malnourished early in life would be stunted at the end of the period of malnutrition and would remain stunted throughout the rest of their lives no matter *how* they were rehabilitated, and a second claiming that children stunted at the end of the period of malnutrition, if properly

Figure 2. Child with marasmus.

rehabilitated, would resume their expected stature. The literature during the early part of this century cites arguments for both sides of the story.

In the early 1950s some classical experiments at Cambridge University by Widdowson and McCance began to shed light on this problem.[1] These investigators performed a very simple experiment. They malnourished two groups of rats during their growth, but they imposed the malnutrition at two different times in that period. In one group, the malnourishment occurred from birth until weaning; in the second group, after weaning but while the animal was still growing. The

investigators found that the first group of animals were stunted at the end of the period of malnutrition and remained stunted for the rest of their lives, no matter how they were later fed. By contrast, the second group of animals were also stunted at the end of the malnutrition, but when they were refed they regained the size of normal controls. These investigators thus introduced another element into the equation—the element of time. They showed that there must be something fundamentally different between *early* growth and *later* growth that allows the animal to recover when malnourished later but precludes such recovery when the malnutrition is early. And yet by the measurements available to them in the early 1950s—length, height, various circumferences, and other anthropomorphic measurements—they were unable to differentiate what that fundamental difference was.

In the early 1960s two investigators in Montreal, Canada—Enesco and LeBlond—were studying what on the surface appeared to be a totally different problem.[2] They were asking the question: as any organ grows, is it growing because 1) the number of component parts (that is, the number of cells) is increasing; 2) the size of the individual cell is getting larger; or 3) there is some combination of the two previous reasons? They knew already that there was one substance which was present in a constant amount (depending on the species) in every diploid cell in the body—DNA. Every rat cell has precisely the same amount of DNA as every other rat cell (6.2 picograms), and every human cell has the same amount of DNA as every other human cell (6.0 picograms). By measuring the total DNA content in an organ and dividing the amount by the DNA content in each cell of the species used for study, one could calculate the number of cells in any organ of any experimental animal. Another way of looking at it is simply to say that since DNA content is constant, it will reflect the number of cells whether or not one divides by that constant. Similarly, the weight-to-DNA ratio or the ratio of protein to DNA reflects the cell size, because once the number of cells has been determined, taking the weight of the organ and performing a simple division produces the weight per cell or the protein content per cell. The RNA/DNA ratio will reflect the amount of RNA per cell, and any substance which is intracellular, when placed in a ratio to DNA, reflects the content of that substance in a cell. For example, the lipid-to-DNA ratio reflects the amount of lipid per cell—this determination is important for adipose tissue and also important in brain tissue.

What the Canadian investigators did was to follow the growth of the various organs of the rat during the time when the organs grow, from before birth until 120 days of life. They found that in every case during this period, the number of cells reached a maximum before growth stops. The time at which the maximum cell count is reached varies from organ to organ. In the brain it occurs very early, at about twenty-one days postnatally. In the heart it occurs much later, at about sixty-five days postnatally. Nevertheless, in every case the increase in the number of cells stops before growth stops—there is a period of growth when the organs are enlarging but the number of cells is not increasing.

If we look at growth very carefully, we can describe three distinct periods. The first is marked by an increase in DNA content with total protein content increasing at the same rate, so that the ratio does not change—growth is accomplished by increase in cell number or hyperplasia alone. Secondly, as a consequence of the slowing down of cell division, the ratio of protein to DNA begins to rise—growth occurs by both hyperplasia and hypertrophy. Finally, cell division stops, protein continues to be laid down, and the cells get larger—growth is accomplished by hypertrophy alone. Considering these three stages of growth, one may now ask, does the fundamental difference between early growth and later growth (observed by the British investigators) explain whether or not an animal is able to recover from a bout of severe starvation early in life?

Our laboratory investigated this question with three groups of rats—we malnourished them *all* for a period of twenty-one days, but we imposed the malnutrition at three different times.[3] The first group was malnourished from birth to twenty-one days, a time when *all* of the organs were growing by hyperplasia; the second group, from twenty-two to forty-three days, a time when all of the organs were growing by hyperplasia except the brain and the lung, which were growing by hypertrophy; the last group, from sixty-five to eighty-six days, when *all* the organs were growing by hypertrophy. We examined these organs at the end of the period of malnutrition or after the animal had reached adulthood.

In the first group, at the end of the period of malnutrition, there was a roughly proportional reduction in weight, protein, RNA, and DNA. The DNA content was down, the number of cells was reduced, and the size of the cell was not affected. If these animals were refed, they showed a deficit in their total number of cells. In the second group,

there was again a reduction in the number of cells in all of the organs except the brain and the lung. These two organs retained the normal number of cells that they had before the experiment started. Here, both the *size* of the cell and the *ratio* of protein to DNA were reduced; when these animals were refed, the tissues of the brain and lung recovered. The rest of the organs in these animals showed a deficit in their total number of cells. In every case in the last group, the *size* of the cells was reduced, and when these animals were refed, all of the organs recovered. We clearly discovered in this experiment with rats the fundamental difference that the Canadian investigators had seen. Cells will divide only for a fixed period of time, and if malnutrition occurs during the hyperplastic phase of growth and slows down the rate of cell division, the organism completes its growth with fewer cells—this change is permanent. By contrast, if the malnutrition occurs during the period of cell enlargement, then enlargement is prevented, but if the animal is refed, the cells simply fill with protein and resume their normal size.

These data also suggested something else. They said that the number of cells that any organ or organism contains is not fixed genetically but that the environment, acting at a critical period during the time when cells are active and dividing, is able to influence that number. In addition, *early* nutrition is an important component of that environment. One can manipulate an organism's final number of cells by manipulating its early nutrition. In an experiment in which animals were overfed from birth until weaning, the number of cells increased in all of the organs, including the brain.[4] Later experimenters examined this manipulation of nutrition on adipose tissue and, in fact, found that the same effect occurs—one can increase the number of adiposites by increasing nutrition early in life.[5]

In our laboratory, the principal focus of discussion is on the brain. In the regional pattern of growth in the rat brain, the most rapid rate of cell division occurs in the cerebellum. In the cerebrum the rate is slower but the period of cell division lasts longer. In the brain stem, at about fourteen days of age, cell division stops. In the area of the hippocampus there is a very discrete increase in size between fourteen and seventeen days; however, this increase is not due to cell division but to migration of cells from under the lateral ventricle into the hippocampus—this movement occurs precisely on the fifteenth day in the rat.

If a rat is malnourished from birth, its cerebellum is affected earliest and most profoundly. The cerebrum shows the effects of malnourishment later and less profoundly, and the migration of cells into the hippocampus is prevented. This effect of early malnutrition demonstrates a general principle: it makes no difference what area of the brain is investigated. What is important is the rate of cell division within that area. The more rapid the rate of cell division, the more profound the effects of early malnutrition. This effect occurs in all cells in the brain. It makes no difference whether the cells are neurons or glia; as long as the cells are dividing, malnutrition will slow down their rate of division.

By the end of the 1960s our laboratory was quite convinced that severe early malnutrition, bordering on starvation, could produce severe cellular changes in the developing brains of animals. Furthermore, the effects were permanent. The next question obviously was whether these changes were occurring in the brains of children who were current or past victims of malnutrition.

In order to answer that question, the pattern of cell division in the human brain had to be determined. After studying the brains of children who were normal in every way but who died of some catastrophic event— accident, poisoning, crib death, or therapeutic abortion—one could plot the weight or the total protein in the brain. From before birth until beyond a year of age, the increase is linear. By contrast, the number of cells increases linearly until birth and then begins to level off—by about eighteen months of age we have all the cells in our brain that we are going to have. Brain growth after eighteen months of age is by increase in cell size rather than by increase in cell number. Therefore, if one were to study the effects of severe early malnutrition on the cellularity of the human brain, then the first eighteen months of life would be of the most concern. This pattern of cell division occurs in all regions of the human brain; in the cerebrum, cerebellum, and brain stem, at eighteen months cell division stops.

In children who die from marasmus, the weight and protein content of the brain is markedly reduced. Also, the numbers of cells in the brains of these children are much lower than normal, particularly in the cerebrum, cerebellum, and brain stem. There is an across-the-board reduction in the number of cells in the brains of children who die of severe early malnutrition. Before these studies, others strongly suggested that myelination in the brains of animals was reduced after severe early

malnutrition. In the brains of malnourished children, total brain cholesterol (one measure of myelin) is reduced along with total brain phospholipids (another measure of myelin). Also, the ratio of lipids to DNA and the amount of lipid per cell are normal in these children for about the first year. This indicates that the myelination is being reduced at the same rate as cell division. Myelination continues for a longer time than cell division, and if the malnutrition persists, the amount of myelin per cell drops. This is precisely what was found in the rats, pigs, and dogs that had been studied.

By the middle of the 1970s it was clear that the malnutrition occurring around the world was producing in the human brain the same kind of permanent structural damage that was being produced in the animal brain. In a human one could measure one thing that was not measured in animals (for lack of measured standards): head circumference. The head circumference of a severely malnourished child is reduced, a fact known for a long time. This is conspicuously true in children who die of malnutrition. If the brain weight is plotted against the head circumference, values for both the normal and the malnourished child fall on the same line or the same curve. Head circumference

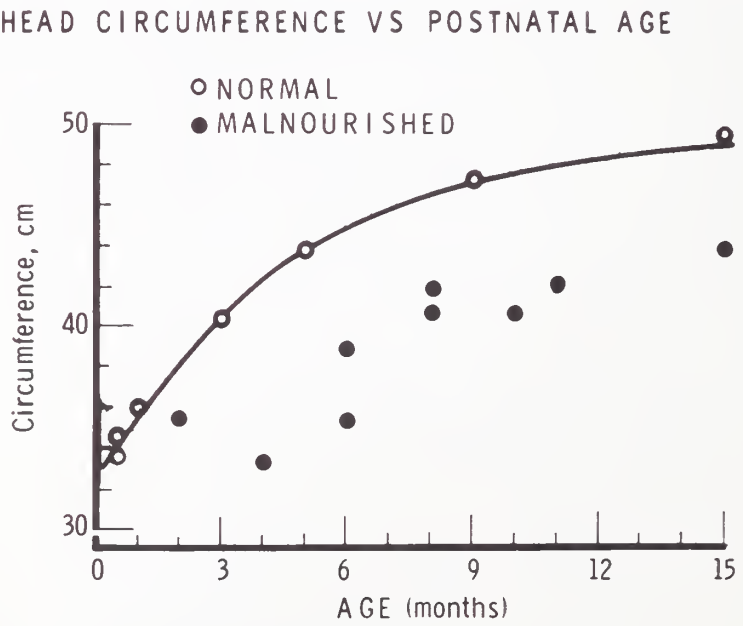

Figure 3. Head circumference in normal and malnourished children.

accurately reflects brain weight in either malnourished or non-malnourished children. The same is true of brain protein and the number of cells in the brain, except for rare cases in which the number of cells is reduced even more than the head circumference—this was seen in children malnourished both *in utero* and then postnatally. The important point is that with the measurement one has a useful clinical tool to determine the extent of internal structural damage.

During this period of investigation, experiments in animals and in children demonstrated that severe early malnutrition left behavioral changes which, in themselves, seemed to be permanent. Experiments showed that animals did not run mazes properly, that they did not explore their environment properly, that they were very irritable, and that all of these changes persisted into adult life. The human studies showed that children who were severely malnourished early in life scored 30 to 40 points lower on I.Q. scores and that their school performance was several grades below that expected.[6]

Had this report been published the late 1970s, it would have ended with certain conclusions—that severe early malnutrition in young children produces changes in the brain; that these cellular changes are reflected by head circumference and reduced body length; that if these children survived there would be functional changes in terms of their behavior, and that these functional changes would also be reflected by their head circumferences and body lengths. The greater the retardation of head circumference, the greater the structural and functional changes.

However, in the later part of the 1970s a few observations altered these conclusions. The first came from the animal psychologist who noted that animals isolated from their environment from birth showed exactly the same behavioral changes as animals who were severely malnourished at birth. A theory evolved suggesting that malnutrition functionally isolated the animal from its environment, so that it could not get the normal kinds of stimuli at the time that it needed them. A very clever experiment was done at Cornell University in which four groups of animals were studied.[7] One group was handled (a way of stimulating the animal) and well nourished, another was not handled but well nourished, a third was handled and malnourished, and a fourth was neither handled or nourished well. Stimulated, well-nourished animals showed the best results; non-stimulated, well-nourished animals and stimulated, malnourished animals performed similarly but poorer

than the handled, well-fed rats; and animals both isolated and malnourished performed most poorly.

At the time of these experiments, others were suggesting that perhaps the same effects could be seen in humans. For example, children at age six or seven who suffered early in life from the malnourishment that accompanied severe cystic fibrosis did not show the behavioral deficits that the malnourished children in developing countries were showing at the same age. Behavioral deficits were also absent in children who suffered from severe pyloric stenosis and were extremely malnourished.[8] Perhaps if one could introduce environmental stimulation into the life of children who were malnourished, one could prevent or even reverse some of the expected effects. But could this be done in children malnourished and living under conditions of poverty that occur in so many countries throughout the world?

To answer that question, a study was done on three groups of Korean children, all adopted before the age of three by middle class American families.[9] Members of one group were severely malnourished in the first year of life; they were born at normal birth weight and were measured below the third percentile for height and weight by the time they were one year of age—they were victims of very severe malnutrition. Children in the second group were moderately malnourished (below the twenty-fifth percentile), and those in the third group were well nourished. All three groups were examined in school when they were about twelve years of age, after spending at least nine years with their adopted family. The average I.Q. of the children who had been severely malnourished was 102. For the children who were well nourished as infants, the average I.Q. was 112, a statistically significant difference. Nevertheless, the important point is the enormous recovery that occurred in the severely malnourished group. Had these children been returned to the environment that had produced their malnutrition, they would have had I.Q.s ranging in the 60s or 70s (a prediction based on numerous studies). The effects on school performance were similar. Undernourished children showed achievement at normal levels for school children in the United States, whereas previously well-nourished children performed somewhat better.

At what age does one have to introduce this kind of stimulation? The experiment was repeated with children adopted after they were three years old—between three and five years of age.[10] In this group, all showed lowered I.Q. and school performance. The children who had been malnourished early in life were performing below the United

States norms. But even these children were doing better than one would expect had they gone back to the environment that produced the malnutrition. In fact, one could draw a straight line in terms of outcome and time of adoption—the earlier the environment was changed, the better these children did. Now there was evidence that, at least for those living in poverty in Third World countries, the effects of malnutrition could be reversible if the environment were changed early enough.

We must ask if severe malnutrition and its effects occur in the United States. In a study of two groups of children in New York City, an assumption was made that the environment was much more stable for the child placed in a single foster home for a long period of time than it was for the child who was frequently moved from foster home to foster home.[11] When the I.Q. scores of children under these two conditions were checked, it was found that the children who lived in many foster homes had I.Q. scores that were, on the average, 14 points lower than the I.Q. scores of the children in the single foster homes. It may be argued that children with low I.Q. scores would be less desirable to foster parents and would therefore be moved from home to home, but one more fact must be examined. When the I.Q. scores of the children in the single foster homes are plotted against their height—remember that if they were severely malnourished, they would be stunted in their growth—we find absolutely no correlation. In other words, I.Q. level is not affected by whether the child was tall or short if the child had been raised in a single foster home. On the other hand, the children raised in many foster homes showed a *very* direct correlation between I.Q. and height. The children who were shortest had the lowest I.Q.s, suggesting again that in early life some factor contributing to short stature interacted with the environment and produced a low I.Q. level. We do not know that these effects were caused by early malnutrition. We do not have birth weights on these children, and it may be that they were underweight at birth. But the point is again that an interaction of environmental and nutritional events is suggested in this particular study.

However, one can go wrong in these kinds of studies. While our group was studying malnutrition, a friend who was vice-president of a large foundation called and said, "We have a particular interest in juvenile delinquency, and I wondered with all the kinds of work that you and others have been doing in the area of early malnutrition and behavior, is it possible that juvenile delinquents might have, in fact, a

greater preponderance of early malnutrition in their history?"

The idea, though a little far-fetched, was intriguing. We decided that if in fact severe malnutrition were a part of the history of children who are delinquent, then deliquent children would be short—they would be stunted in their growth. We planned a quick study to measure these children and see if this idea were true.

We studied black children in the juvenile facility at Riker's Island and in P.S. 143, and we found that juvenile delinquents were shorter than non-delinquent children. Race was not a factor, because the same pattern applied to Hispanic children. Finally, if the whole population were studied, there would be absolutely no question that the juvenile delinquent population was shorter than average.

It turned out that these data were repeated in several places, and it was found that for boys—the population we studied—this correlation held. It was not true for girls, however, and here we found that we had made a very serious mistake. We were measuring chronological age rather than sexual maturity. The delinquent boys we studied went into delayed puberty and that was why they happened to be small. It had nothing to do with their early nutrition, since there is no evidence that *early* malnutrition results in delayed puberty.

There is little question that malnutrition early in life, severe malnutrition, causes permanent structural changes in the human brain. It is also quite clear that if that malnutrition occurs in a socially deprived environment, it will result in permanent behavioral changes that are manifested in a lowered I.Q. and poor school performance. The fact that malnutrition alone does not do this is interesting, but in the world in which we live the majority of malnutrition occurs under circumstances that will lead to this kind of permanent retardation. It behooves us in our own society and in our dealings with societies throughout the world to attempt to deal with the most easily curable of all of the diseases and to deal with it in the context of the social environment in which it occurs and which produces it. Only if we approach the two concomitantly are we going to be able to make a dent in a problem which affects more than 300,000,000 people alive today throughout the world.

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Editor's Note

READERS of this issue of *Transactions and Studies* will mark several changes in its format. With the hope of reducing costs while maintaining archival quality, paper of lighter weight has been used for the cover and the embossed insignia has been eliminated. As an additional feature, a summary precedes each article. And, since its founding the College of Physicians has, among other functions, served as a common forum for the city's six medical centers, a new feature, "Academia," has been introduced. Its aim is to discourage parochialism by informing members of one institution of what is going on in the others.

From the time of its founding, the mission of *Transactions* has been simply what its title states—a record of scientific, historical, and biographic discourse of interest to all members of the healing arts. Speakers of whatever discipline who lecture in College halls are urged to submit their manuscripts or tapes to the Editor for a reading and possible publication. Communications and manuscripts will be welcomed from readers afield as will drawings and photographs of scientific interest. Should the supply warrant, comments and letters will be published, subject to as gentle editing as conscience permits.

—J. L. McC.

Use of Reproductive Health Care Services by Minority Women and Their Impact

EMILY H. MUDD, ELLEN W. FREEMAN, AND KARL RICKELS

SUMMARY: A team of health workers investigating pregnancies of minority women, predominately black, over a period of eighteen years concluded that most of them, married and unmarried, would benefit from regular, sympathetic counselling in their sexual activity. Free communication is desirable not only with adolescent girls but with their male partners. There is promise that such a program will eventually establish a sense of responsibility in patients of all ages.

MEMBERS of all ethnic groups have been brought increasingly into greater contact since the 1960s because civil rights legislation has promoted integration in public accommodations, jobs, and schools.[1] One major result of these relationships is the overall response of minorities within the social structures of our institutions of education, health, and law.[2] This report presents data from our interdisciplinary research group of doctors, social workers, nurses, and aides who studied the attitudes of members of minority groups toward the health care system over a period of eighteen years (1966–1984). From contacts with several thousand urban black women participating in reproductive health care programs, a variety of information has been obtained on staff and patient attitudes, feelings, and behaviors that reflect the changes of the past two decades.

Dr. Mudd is Professor Emeritus of Family Study in Psychiatry and Former Director of the Marriage Council of Philadelphia, Dr. Freeman is Research Assistant Professor in Obstetrics and Gynecology, and Dr. Rickels is Professor in Psychiatry and the Stuart and Emily B.H. Mudd Professor of Human Behavior and Reproduction; all are at the University of Pennsylvania. This paper was presented in part at the Seventh National Association of Social Workers Professional Symposium on November 21, 1981, in Philadelphia. Special recognition is given to the Teen Clinic staff and in particular to Ms. Jacqueline Logan, who so ably led the school rap sessions.

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A Training Grant from NIMH Initiates New Approaches

Our first exploration was by individual interviews in 1968 with 81 black women following childbirth in the Hospital of the University of Pennsylvania. Each of these women returned voluntarily to the hospital's family planning service and was willing to answer questions while waiting to see the doctor. Twenty-one of the husbands were also interviewed at the clinic or at their homes.[3]

Family stresses cited in these interviews by both wives and husbands included job difficulties due to lack of education and to discrimination, financial stress, and limitations of public assistance. Marital dissatisfactions emphasized lack of affection, lack of understanding and emotional support, infidelity, and poor communication. Overcrowded housing, working wives, and child care were major difficulties, as were problem children—thieving, gangs, and truancy. Sex, planned parenthood, and single parent's problems (1/5 of the women were unmarried) along with unwanted pregnancies and anxieties were frequently mentioned items. Husbands felt their loss of control in relation to their wives. They also resented the authority of the institution and its representatives, who appeared to contribute to their separation from fertility management and to their loss of control in marital relationships.

Finally, these black women and men did not usually seek economic, social, or medical help until things were very difficult. They believed that other people thought they were not important, that others would not help them, or that professional people should not be bothered with problems they ought to handle themselves. They tried not to show the rejection they often experience in their relations with others. Both men and women agreed that the obstacles to using professional services in order of rank were fees, the sex and attitude of the helping person, and availability. They saw the factor of race differently—men rated it fourth and women rated it eighth or lowest. These findings brought to the fore the distance between the needs of troubled minority families, the abilities of professional personnel, and the types of services offered by community and medical institutions. This challenged us to devise ways to reduce these distances. We proposed to contact women earlier in their reproductive lives, during pregnancy rather than after delivery.

A team of a man and a woman interviewed 100 pregnant black women who were waiting to see their doctor. The majority of these women clearly expressed the desire to limit the number of their

children. Some women felt uneasy about discussing family planning methods because they felt the subject was associated intimately with their sexuality. Some also felt that the physicians were always in a hurry and did not have much time to counsel them. Overwhelmingly evident was the need of these women for time to discuss comfortably with an understanding professional their private feelings concerning sex and marriage.[4] Cooperation between physicians and nonphysician associates serves as a vital ingredient in a medical clinic setting. The concept of providing counsel together with medical treatment has been important in medicine from time immemorial.[5]

Included in our contacts with the 100 pregnant black women were 82 patients eighteen years of age or younger; many of them were not married. It seemed obvious that the health, psycho-social, educational, and economic problems which surrounded these pregnant teenagers would be experienced by them and their babies. Our next study focused on pregnant teenagers. This work was facilitated through a specialized service for teenagers only, established in 1967 by Dr. Helen Dickens, a Board-certified obstetrician-gynecologist who was able to make important contacts in the black community. She believed "the pregnant, usually unmarried teenager to be uncomfortable, disadvantaged, and fearful in a clinic containing many women of her mother's age."

Services for Pregnant Teens

From this Teen Clinic between 1967 and 1970, we chose at random 50 black adolescents in their first pregnancy and compared them in attitudes, behavior, and follow-up to a group with similar background characteristics from the regular prenatal hospital clinic. Findings indicated little difference between the two groups in prenatal health and clinic attendance, delivery complications, and the condition of their infants. Suggestive differences appeared in the early postpartum follow-up. More girls from the Teen Clinic, which offered group and other supportive services, attended clinic classes, accepted contraceptives, and returned to school. Fewer girls in the Teen Clinic group had repeat pregnancies at the one-year follow-up. However, a follow-up of both groups after approximately two and one-half years showed that the percentage of repeat pregnancies had increased substantially and was identical for both groups.[6] Thus, the next challenge was to reach teenage girls before pregnancy occurred.

During the late 1960s never-pregnant, unmarried young women had almost no access to medical contraceptive services. Not until 1970 did the federal government fund family planning services. Our initial efforts were to provide preventive educational and therapeutic services to nonpregnant sisters and friends of pregnant teen patients contacted through neighborhood discussion groups. These groups were led by black social workers and patients from the Teen Clinic program after the birth of their babies.

Educational Approaches—A Public School's Participation

An educational approach to teenagers through city high schools was initiated with funds from the Jessie Smith Noyes Foundation and the Lebensburger Foundation in 1973 and 1974. A school nurse was found who was concerned both with the pregnancies and with the care of the babies so that the mother could return to school. The physician and director of nursing for the Board of Education as well as hospital obstetrical and gynecological staff were interested and cooperative in implementing a pilot program. All was accomplished with the approval of the principal of the school selected.

Under school regulations, health education was acceptable and pupils could be referred for medical services. Through the support of these key personnel it became possible to organize in the school weekly educational classes, informal counseling, and discussion groups often referred to as "rap sessions." A total of 170 students attended the sessions at the high school, of whom 74 requested referral to the University Hospital Family Planning Clinic for examination and possible contraception. Some girls had parental consent and some did not; all were accepted in the program. Our report stated: "It is our conviction that, as these young women learn in a constructive way that pregnancy is a matter of *choice* for them, they will be able to move into a future responsible relationship with the ability to handle adequately and with dignity, desired and planned motherhood."[7]

During the 1970s, teen pregnancies in the United States became an alarming problem with social, emotional, and economic ramifications. The cost of prenatal, postnatal, and pediatric care for these often unwanted pregnancies exceeded drastically the cost of education and medical service offered to the never-pregnant teenager. However, reaching young people who have not stated their needs and asked for

treatment is a sensitive and explosive issue, which we connect with the issue of informed consent. Informed consent is a critical component of adolescent health services and a key to working with teenagers who are learning about their bodies and feelings and developing the foundation of self-management of their health and behavior.[8] Our data from teens do not support the idea that teenagers become pregnant because they choose to. Most teenage pregnancies probably are truly unwanted. However, simply dispensing contraceptives in a medical service is not enough. Teenagers need education and emotional support to enable them to develop responsible behavior and caring relationships.[9]

The Male's Involvement—Is He Willing?

As contacts with teenagers continued, the paucity of information concerning male adolescents became a serious drawback in understanding and treatment. Male attitudes may be all the more important if female sexual activity is a response to male initiative. There were 358 females and 249 males in our family life classes presented in high school during the 1977–1978 school year. Answers to questionnaire items administered in these classes indicated that males were less likely to recognize the risk of pregnancy, knew less about contraceptives, and had fewer attitudes that supported contraceptive use than the females in the same school classes. Furthermore, males were likely to believe that females *did have* correct information about contraception and that contraception is a matter for females and only indirectly related to themselves. These findings suggested that developing educational and counseling programs is critical for males, who have less information about contraceptives and fewer resources that provide such information.[10]

Reports from teens of emotional distress indicated we were working with young people who, on the whole, are coping successfully with the stresses of daily life. Their pregnancies do not seem to result from emotional pathology.[11] Self-reported questionnaire data from 400 females under age 17 who were never pregnant and who enrolled for contraceptive services showed that continuation in family planning programs was strongly associated with sexual activity and with consistent contraceptive use. Those who discontinued their participation in the program often reported the absence of sexual activity and discontinuation of contraceptive use. In spite of initial experience with medical contraceptive services, neither continuers nor discontinuers of program

services knew how to protect themselves from pregnancy when they discontinued contraception (typically, the Pill, which is ineffective when not in continuous use). Communication and educational programs that actively involve teens in information-building and decision-making are still vital needs in teen family planning services.[12]

The importance of teaching young people about their sexual relationships and the effects of early childbearing was further emphasized when we compared adolescents who enrolled in family planning before pregnancy occurred with the 14- to 17-year-old adolescents who enrolled only after abortion or delivery of pregnancy. Deliverers had less information about contraception, were less likely to talk about contraception with their partners, and were less likely to know how pregnancy would affect their lives than the young women who were never pregnant. Additional data suggested that particularly among those who delivered pregnancies, there was lack of awareness of the long-term significance of early childbearing and the belief that teenage parenthood is an acceptable choice. These are attitudes not only of teenagers but also of the society in which they live. In addition to access to contraceptive services, adolescents need information, guidance, and leadership from parents, community leaders, physicians, counselors, and other health care professionals who stress the importance of delayed parenthood.[13]

Why Teen Pregnancies?

In 1980, the National Institute of Child Health and Development (NICHD) awarded our group a substantial four-year grant to further identify social, behavioral, attitudinal, and emotional factors that influence unwanted pregnancies in adolescents. Nearly 400 urban, black, young women in our teen programs (aged 14 to 17) enrolled in this study. Each participant was interviewed four times over a two-year period. One wrote:

> It is always good to hear from the Teen Study because I have learned so much about life and the proper knowledge of sex there. . . . I have done a lot with my life since the study began, starting college again and not stopping this time. . . .

Interviews with 30 young men, partners of pregnant girls in the study, found that very few had experienced any discussion with parents about contraception, pregnancy, or its effects; neither did they think about

the likelihood of pregnancy. They wanted to be good fathers, but had little idea what responsibilities would entail. They "were unable to convey any sense of how they were going to reach their goals of being married, working, and a house owner." Nearly all responded that they would like to talk about the pregnancy and parenthood with a health care professional, but felt they were not included.[14]

Investigation of the mother's role in adolescent reproductive health care showed that never-pregnant teens using contraception reported more communication about sexual topics with their mothers than the teens who conceived, and that a few girls with no sexual experience had more discussion than did the never-pregnant group. We expected that never-pregnant girls would be closer to their mothers than conceivers would be, but data indicated that daughters who had delivered were "closer" to their mothers, who were more likely to know that their daughters were using contraception. However, this knowledge appeared to *follow* pregnancy. We hope our findings will help mothers tell their children about the long-term effects of pregnancy and will encourage them to teach ways to prevent unwanted pregnancies.

Conclusion

Certain themes emerge from this 18-year sequence of counseling, education, and research. Paramount is *communication.* Initially we saw that women needed to be heard and wanted to discuss their personal and private concerns with an understanding professional as part of taking responsibility for their reproductive health care. The direct communication between counselors, physicians, and women patients identified unmet needs and challenged our professional staff to define and participate in new approaches. Reproductive health care expanded from serving primarily married women to teaching all sexually active young women. Adolescents, for whom childbearing seriously impedes goals in education and careers, became a major focus. The interdisciplinary research teams also experienced the importance of communication among themselves in order to provide effective services. Communication encouraged the emphasis of flexibility rather than rigidity in the program.

Through communication we found that adult males, usually ignored in the professional relationships of reproductive health services, were willing and wanted to be included. They, as well as their partners,

resented their exclusion by professionals. A decade later, the teenage males felt excluded when they perceived reproductive health care as oriented toward and dominated by females. This poses current challenges for counseling, educational, and medical services to include men in reproductive health care programs.

Finally, communication has no magic alone. It must be grounded in support and caring—an essential of a constructive counseling relationship. In perceiving genuine support and caring of the physicians, counselors, and all involved staff, our patients of all ages gained strength to mobilize *themselves* as active directors of their health care.[15]

Many changes have transpired for minorities over the past two decades.[16] In overall fertility, blacks now approach the norm, and concerns about fertility that were formerly dismissed as racist are now addressed by black leaders, one of whom believes that the "mushrooming numbers of teenage pregnancies and fatherless families threaten to halt black progress and throw a shadow over generations to come."[17] Blacks themselves, he insists, must help resolve these difficulties by counseling with young people about these long-term problems. On the basis of our contacts with minorities and others during the past 18 years, it is our hope and expectation that medical services, founded on the desire to understand current and future perspectives and to be understood by parents, families, and friends, will continue to be a bond linking present health procedures with a constructive future.

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Health, Medicine, and Violence On TV

GEORGE GERBNER

SUMMARY: Television is a new cultural environment in which we learn values and behavior patterns. In the TV world, segments of the population are over- and under-represented, certain professions are stereotyped, and critical social calamities such as violence, alcoholism, and vehicular mayhem are commonly understated. TV is the principal source of health information today. It will require great public effort to bring changes to the medium that will direct young people, particularly, toward a more critical and realistic view of our culture.

IN his report to the American people entitled "Healthy People," the Surgeon General of the United States reported and announced a new frontier in medicine. His report stated that more than half of American mortality today can be accounted for by what is called behavioral or life-style factors. This category was by far the greatest cause of mortality, followed by environmental conditions (20%), human biological factors (apx. 20%), and inadequacy or deficiency in health care or its delivery (10%).[1] So the new frontier in medicine is the study of behavioral and life-style factors—culturally induced behaviors that hurt and kill people. In other words, it is a manufactured disease generated by stories we tell about life and how to live it.

The central producer of stories today, the storyteller that tells the most stories to the most people most of the time, is television. Television is the largest single source of health-related (and most other) information to the American people, particularly to that vast majority who do not *seek* information. It is, therefore, a central sector of the new battle in health promotion and disease prevention, and my report to you is from that front. It is based on about fifteen years of research on what television is and what lessons it teaches to all of us and to our

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children. In developing that report I am going to touch on three things. First, on television: what it is and what kind of a world it presents to all of us born into and growing up in it. Second, on its lessons: what do we learn, especially about health, by being born into and by growing up in that world. And third, our response: what, if anything, can we do about this problem.

What is television? Unlike all other media, unlike books, films, and magazines, all of which are essentially selectively used, television is a relatively *non-selectively used medium.* Believe it or not, most viewers watch television an average of 6½ hours a day, which means that it is turned on in the morning and then turned off in the evening in more than half of all American homes. It is like a ritual—that is the first and most important thing to remember about television. It is used non-selectively. Television is the only way to reach the entire community with a message, usually the message of the sponsor, but with many others embedded in the programs. It is, in fact, almost like a new religion.

For the first time in history our children are born into a home in which there is a storyteller coming from far away, from a few distant corporations. It is no longer the parent, the church, or the school that tells the stories. Now most of the stories are told by television. The child is born into a world whose design, whose construction, whose casting, whose action structure, whose values, and whose sense of proportion comes from television.

What kind of a world is it? First of all, it is a world in which men outnumber women at least 3 to 1—what kind of a world is *that?* Once you begin with such an enormous distortion, nothing thereafter really can be quite right. But what does that mean? It does not mean that we grow up thinking that there are three times as many men as there are women—that is not the way these stories and lessons work. Even though we will not believe that there are many more men than women, we believe that men have many more opportunities, many more roles, and many more functions in life. The lesson of under-representation, and you can extend that lesson to other minorities, is that those groups lead a limited life style and have a narrower range of opportunities, capabilities, responsibilities, positions, and activities in life than do the social types that are over-represented.

As you probably know, people aged sixty-five and over now make up about twelve percent of our population; they are the most rapidly

growing and, in many ways, vigorous segment of our people. On television this group is less than two percent of the people shown and is practically invisible. Our research finds that by being out of sight, older people are also pretty much out of mind. The more one watches television the more one agrees with the statement on our questionnaires that older people are less numerous, less healthy, less wealthy, and less powerful than they used to be ten years ago. All of these opinions are contrary to the facts of life but are in accord with life on television. So television tends to cultivate a notion that older people are a vanishing breed. This presents an increasingly formidable social problem, not only in the calamitous decline of support for Social Security, but in the many ways in which we will have to find support in the future for an aging population.

In the world of television, violence and crime are depicted beyond their incidence in life. Violence occurs at the rate of five incidents per hour. Over a period of fifteen years, the changes in this rate amount to no more than ten percent up or down. The rate has been essentially stable because violence is a demonstration of power. Who is likely to get away with what against whom? That is the lesson taught by violence. While indeed it is true that the enormous frequency of violence and violent representations on television cultivate our acceptance of violence and aggression as a solution to problems, the incitant and stimulating power of violent representations affects only a minority of people. The other side of that coin is fear. Most of us exposed to violent representations of life become more insecure and come to think of the world as a mean and dangerous place in which we are extremely vulnerable—and perhaps we are. But our sense of vulnerability has nothing to do with the facts. It has to do with the amount of exposure to the images and the amount of publicity we receive in our community about crime and violence.

The more television you see, the more you are subjected to what we call the *mean world syndrome,* which is a sense of insecurity and alienation, a demand for protection, and an acceptance of repression if it comes under the name of security. It is one of the oldest political formulas used throughout history to attempt to control people.

Despite the abundance of violence, pain and suffering—the true consequences—are rarely shown. The percentage of people who need any kind of therapy or medical intervention is very low (about six or seven percent), and yet the number of *doctors* is high. The average

viewer of prime-time television sees twelve doctors and six nurses a week, week in and week out, in intimate detail. They not only perform delicate surgical operations but much more often sit around in the hospital cafeteria talking about romantic affairs, rush off to perform open heart surgery, and then come back to pick up the conversation where it left off. Medicine is the most frequently represented profession, and professionals are the majority of the people in the world of television.

The prime-time viewer of television sees not only twelve doctors every week but also thirty-five policemen, twenty-three criminals, six lawyers, and three judges performing their duties. Most of the world of television's prime-time is made up of people connected with the law, as either law breakers or law enforcers, and people connected with the health professions. Next most popular are those in entertainment, and way down on the list are the people who make up sixty-five to seventy percent of our real population—the blue collar and service workers. This group takes up about ten percent of the television population, and this inequity creates problems for our young people who are thinking about occupational choice; very often they know more about rare occupations like surgery than about what their own fathers do. They certainly know a great deal more about what a policeman does and what a police station looks like, even though they have never been in one, or what an operating room looks like, or what a court-room looks like, than about most other places that they have encountered.

Their image of the doctor is the most favorable image on television. It is one of daring and authority not limited to medical affairs. It is one of people who can dominate and control the lives of others—a message, I am afraid, too often taken too seriously by too many doctors. Doctors on television are taking risks and always winning. The old administrator is cautious; the young doctor, risk-taker, confronts the authority and gets away with it; the patient, of course, always recovers. The doctor also always has plenty of time because he is frequently on house calls and is infinitely accessible to patients.

There is a lot of eating and drinking on television, and only some of it is in commercials. Of the approximately 25,000 commercials we see a year, over 5,000 are for food products and well over half of these are for sweets, high in calories, and low in nutrition. Only about nine percent of the commercials for food make any nutritional claims at all. Yet obesity is rarely seen. Television characters are slim, powerful, beautiful,

and very effective. They eat a lot of the wrong kinds of food, but only about six percent of males and two percent of females can be characterized as overweight.

Although there are a lot of food commercials on television, most portrayals of food and of eating come not from commercials but from programs. There is an average of nine portrayals, presentations, or references to eating or drinking on television per hour of prime time. This is an enormous amount of information if one considers the number of hours per day spent watching television and the number of impressions formed by the number of mentions of food and drink in the programs themselves, mentions not so easily identified and scrutinized as on the commercial. Most of the eating on programs is grabbing a snack on the run; very often the snacks and food eaten are also advertised in the commercials.

When there is conflict, tension, frustration, or embarrassment, what do characters do? They reach for a drink. The amount of drinking is enormous—actual drinking occurs on an average of twice an hour and is mentioned about six times per hour in addition to being portrayed. Drinking is inescapable. And yet alcoholism and the portrayal of the effects of alcohol taking a tremendous toll in our communities are negligible. Less than one percent of all characters show any ill effect from drinking, and when they do, it is mostly humorous.

The most frequent safety hazards in the United States today are industrial and traffic accidents, yet they are rarely shown on television. Seat belts are *never* shown. In observing all the driving done on television's prime-time action programs, our research group has not seen a single program in which a hero or even a villain would buckle up a seat belt before driving. And until we see that, we are not going to be able to encourage a sense of driving responsibility and safety in the American people.

The ultimate lesson from all of this—magnificent doctors, nutrition, drinking, and safety—is a curious dual lesson. First, let me note an important methodological point in this kind of research. One cannot compare heavy and light viewers of television without taking into account other factors, because heavy viewers are often people with lower incomes, less education, and fewer opportunities to engage in a variety of cultural activities. They are people for whom television is the most attractive thing going at any time of the day or night. Light viewers, on the other hand, are people who, by and large, have higher

incomes, more education, a greater range of cultural opportunities, and many sources of information, and that is why they spend less time watching television. In comparing these two groups, it is clearly not fair to attribute the differences in their responses only or mainly to television. There are many other differences. What one has to do, therefore, in doing this kind of research is to take a relatively homogeneous group such as college-educated, high-income people who are, on the whole, light viewers and then look at the lighter and heavier viewers among them and within other subgroups. It is through this kind of comparison that we find that the heavy viewers have a systematically different pattern of responses to questions about life, health, medicine, safety, their own security, occupations, educational aspirations, scientists, their image of doctors, and many other things.

And so we arrive at the principal finding: the more television you view, the more complacent you are about eating, drinking, and safety, but at the same time the more you believe in the magical power of medical science. It is as if the viewers say, "Who, me worry? Look at all these people on television. They eat a lot, they drink a lot, they're slim, healthy, and they're effective. And then look at these doctors. If something happens, they'll take care of it." Needless to say this attitude can create frustration, conflict, disappointment, and even litigation.

Overall, we can say that in the many areas of life that we have investigated, including that of health, the overall role of television is to bring people who are otherwise very different from each other closer together. These people become more alike because television tends to counter or overcome differences in age, differences in neighborhood, and differences in racial and ethnic composition of people. The traditional differences among people diminish the more they watch television. And the effect of television depends on the viewer's background.

Take for example, our finding that adolescents who watch more television score, by and large, lower in their scholastic ability and I.Q. tests. In other words, children who watch a lot of television in a higher income, highly educated home where the parents read widely and participate in a great variety of cultural participations, have flattened scores. They do not score on intelligence test as highly as their parents used to or as their light viewing cohorts do. Conversely, children who come from the lowest income group, from groups where there was no reading before, from homes in which there was no cultural participation, from homes in which television truly represents enrichment of cultural

horizons, score higher. They become more like the children of the wealthy families in terms of their test scores. This effect is called *mainstreaming*, the tendency to absorb otherwise different people into the cultural "center," which is today established and cultivated by television.

Now we come to the question of what we can do about television's effect on our lives. First of all, we have to recognize that television is an entertainment medium that provides the most compelling, dramatic environment in which our children grow up. Yet it is primarily designed to sell goods. Its financial base is limited to advertising monies; it has a very useful but limited purpose. As a nation we have not even begun to think systematically about how we can handle this instrument.

We have to get organized. Individual expression is fine. It cannot hurt, and it may occasionally do some good by bringing to the attention of producers, directors, the writers things they have not thought about. But beyond that we have to become organized as professionals. We have to band together as parents and as educators and at the very least demand that our schools on all levels—primary, secondary, and college—make a central part of their curricula the cultivation of analytical and critical viewing. That has become as important today as the analytical, critical approach directed toward classical literature, toward poetry, toward history, and toward all the things that literate people used to do. Today we are surrounded by messages and images, and our schools need to devote central attention to helping young people learn how to come to grips and not just to drift with this new, cultural storytelling machine.

Finally, we have to get organized as citizens. Any solution we come to must be political. The present structure of television has been determined politically. The law that says that advertising expenditures are a tax-deductible business expense takes about ten billion dollars out of the Treasury and puts it into a medium called television through a levy that is included in the price of all the goods we buy. This money,which goes to the advertiser who buys television commercials, amounts yearly to more than $65 per household. It is a significant amount of money, and as citizens and as taxpayers, we should be more interested in how that money is spent. We should want to know not from the point of view of imposing limitations but, on the contrary, from the point of view of liberation from the existing constraints and limitations. We should provide a broader resource base and a more

responsive, more responsible process for determining what kind of culture and what kind of a storytelling mechanism we should have in our homes.

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The Physician's Gold-Headed Cane

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SUMMARY: A rattan malacca cane that figured in the regalia of six highly regarded English physicians from 1689 to 1823, witness to historical events in medicine and fashion, is now on display in the College of Physicians in London. Seven canes, presently exhibited in the College of Physicians of Philadelphia, served a succession of distinguished Philadelphia doctors in later years.

OUT of the shrouded mist of earliest history there emerged the staff and its later refinement, the crook or cane, as an additional human appendage for utilitarian purposes or a badge of authority. King Tutankhamen used a series of golden canes as a symbol of office.[1] The staff of Aesculapius with single serpent,[2] the pole of Moses with the entwined brazen serpent, and the caduceus of double serpents with wings of Mercury are familiar symbols of healing. Supernatural power was required to treat sickness, the causes of which were unknown or erroneously ascribed. This power was groped and grasped for by those who aspired to be rulers or healers of mankind. The classical statue of Hippocrates represented him with a staff.[3]

Physicians throughout history had something which distinguished them from the laity. Medicine men among savage tribes wore special headdresses or costumes. In ancient Babylonia and throughout the East the physician belonged to the class of priests. During the Middle Ages he was a tonsured ecclesiastic, and in France at the time of Moliere he wore a large wig and majestic beard and rode a mule on his daily rounds.[4] The mandatory beard later gave way to the Vandyke. In England prior to the Restoration, physicians made their house rounds on horseback, sitting side-wise, like women, on foot cloths.[4] With the return of Charles II to the throne in 1660, they drove in carriages with a pair of horses, and by the time of Queen Anne's reign the pretentious London physician vaunted his brougham with coachman and four or even six horses.

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By the 17th century the physician often wore a scarlet silk coat, powdered full-bottomed wig, lace ruffles, breeches, stockings, buckled shoes, and gold-headed cane. On entering a house he was followed by a footman bearing his gloves.[4] In some instances, it was part of the ritual on entrance to the sick room for him to strike his cane upon the floor to shake out a little powder from its top and then apply the scented substance to his nostrils. Henry Revell Reynolds, who attended George III, is reputed to have been the last silk-coated physician.[4]

The physician's gold-headed cane, which is the special interest of this article, was only one of the essential accessories for men of the 17th and 18th centuries. Canes were selected to match the dress of the day much in the same manner as neckties or cuff links are chosen today. Voltaire boasted a store of more than 75 canes, while his less opulent compatriot, Jean Jacques Rousseau, owned more than 40.[1] The favorite material for the shaft was malacca, a woody cane belonging to the rattan palms of India, the Malay Peninsula, Australia, and Africa, where it grows in long reeded stalks. It is extremely strong and flexible. Other popular materials were ebony, rosewood, walnut, oak, chestnut, maple, hickory, and mahogany. The heads or handles were fashioned of gold, silver, carved ivory, or polished bone. In addition to their ornamental purpose, many canes contained weapons such as guns and swords, or gadgets such as compasses, cigarette cases, or liquor containers. Indeed, in just over a century, more than 630 gadget canes were patented in England and at least 500 in the United States.[1] It is natural that the physician should have shared in this fashion which was at its peak in the 18th century and faded toward the end of the 19th. Any physician, as a gentleman, could have carried a cane for protection or other utilitarian purpose. It is to more specific canes, however, that this article is addressed; namely, the world-famous gold-headed cane of the College of Physicians of London, the "physician's gold-headed cane" (such as those in the collections of the College of Physicians of Philadelphia), and the ceremonial gold-headed cane awarded today for distinction in the profession.

The Celebrated Original Gold-Headed British Cane

A world-renowned gold-headed cane, now in the College of Physicians of London, was carried in succession by six distinguished physicians, beginning with Radcliffe around 1689 and ending with Baillie in 1823. It was used during the period when canes were an essential part of a physician's equipment.

It is likely that this particular cane would be little more than an idle curiosity, were it not for the fascinating and scholarly account of its owners, the events of the times, and the sights it beheld in a classic "autobiography" by William Macmichael (1784–1839) in which the cane itself speaks as the author.[5] This remarkable book, first published in 1827, has passed through nine British and American editions, the last of which in 1968 was a facsimile of the first. In the fourth edition (1915), Francis R. Packard, who became president of the College of Physicians of Philadelphia in 1931, wrote the preface, and Sir William Osler of Oxford wrote the introduction. While the owners of the cane were all affluent from practice, Macmichael himself was much less so, and received only 100 guineas for his historic masterpiece.[5] Radcliffe, the first owner, is reported to have earned at least 20 guineas a day even early in his career.[5] As often quoted, this most famous of canes "had entree to the presence of Kings and Queens and to the mansions of the greatest of the land; in its maturer years it was carried by its successive owners to the meetings of the learned to find a resting place surrounded by the portraits, the literary remains and the spirit of the great physicians of the past, in the college of which they had been distinguished ornaments."[5] A brief review of its former owners enhances its significance.

The first possessor, John Radcliffe (1650–1714), is remembered (in the words of Sir William Osler) "by the Gold-Headed Cane, second by never having written a line, and third by the superb monuments which exist to his memory."[6] The history of the cane is first recorded for the year 1689, when Radcliffe was aged 39. It was the same year as the death of Sydenham, a medical immortal, following which the thrust of the profession came under the sway of physicians whose fame rested upon their success in practice rather than upon any important additions they made to knowledge. On his deathbed Radcliffe is said to have stated that when he first started practice he had 20 remedies for one disease, but on finishing he had 20 diseases for which there was not a single remedy.

Just how Radcliffe obtained the cane is unknown, but the handle, like its owner, was unorthodox. The usual handle of the physician's cane of that era was round or pear shaped, with a cavity encasing a vial with spirits or an aromatic powder to oppose the noxious odors of the sick room. In contrast, the gold handle of Radcliffe's cane was two inches upright and four inches across, in the form of a crutch, which in time bore the arms of its various owners. The ends of the handle were

indented but not movable, thus precluding a vinaigrette and indicating by its shape that it was used solely for support. The shaft was of Asian rattan malacca and it measured three feet, four inches in length. Radcliffe was physician to Queen Anne and King William III. He was also called in to see Queen Mary, who died of smallpox. All subsequent owners of the cane practiced at the highest level of British society and all had service at the British royal court. Radcliffe was a bachelor who, according to Garrison, was once jilted and once rejected in a marriage proposal.[2] He had the reputation of being niggardly and penurious but subsequently proved to posterity that he saved money for a specific purpose. In addition to his lucrative practice, he doubled his fortune by shrewd investments, and the gifts he gave to Oxford University were probably the largest and most important of any physician—he gave endowments for the Radcliffe Infirmary, Observatory, Library, and two traveling fellowships, all of which still exist.

Richard Mead (1673–1754) received the cane from Radcliffe, who respected the younger man's learning and scholarship. Mead was an avid reader of Hippocrates and Celsus and a voracious collector not only of books but of coins, ceramics, gems, pictures, statuary, and all types of antiquities. His house functioned as a great museum as well as a repository for learning and science, and its fame exceeded even Mead's professional repute. Unfortunately, unlike his predecessor, Mead desired that his collections be auctioned at his death. The sale required 28 days for completion and the items from it are recorded in the *Bibliotheca Meadiana.*[7] In addition to being the most prosperous practitioner of his time, Mead was summoned to consult with Radcliffe at the deathbed of Queen Anne. A monument stands in his honor in Westminister Abbey.

Anthony Askew (1722–1774) became the protégé of Mead, and his library was well known throughout Europe. He, too, at death willed that his collection be sold at auction, and this sale required 19 days. His catalogue, *Bibliotheca Askeviana,* contained the "best, rarest, and most valuable collection of Greek and Latin books that were ever sold in England."[7] Sir William Osler, whose own *Bibliotheca Osleriana* documented the 8,000 books he left to McGill University, lamented the loss of the Mead and Askew collections to university ownership.

William Pitcairn (1711–1791) received the cane from his friend Askew and in time bequeathed it to his nephew, David Pitcairn (1749–1809). These two merely continued the tradition of lucrative practice in London.[5]

Matthew Baillie (1761–1823), Pitcairn's medical advisor and intimate friend, became the final owner of the cane. He was a nephew of the great anatomist-surgeon, John Hunter, who was physician to George III. Baillie's death from pulmonary tuberculosis at age 62 is reputed to have been hastened by his devoting 16 hours a day to his extensive practice. Of the six owners of the Royal College Cane over a span of 134 years, Baillie was the only one to contribute notably to medical science. This he did in his *Morbid Anatomy of Some of the Most Important Parts of the Human Body* (London, 1793) and a subsequent series of engravings that appeared in 1803. It was the first attempt to treat pathology as a subject in itself. A bust of Baillie reposes in Westminister Abbey.

Shortly after Baillie's death, his widow presented the cane to Sir Henry Halford. The latter, as president of the Royal College of Physicians of London (1820–1844), had it housed in a strong protective case in a corner closet of the new college building where, except on rare occasions, it has remained. One of these exceptions occurred in 1950, when Lord Charles Moran, President of the Royal College and Speaker at the convocation ceremony of the American College of Physicians, brought it to the annual meeting in Boston. It was later taken to California to enhance the traditional golden cane ceremony at the University of California in San Francisco.[8]

The Physician's Gold-Headed and Miscellaneous Canes: Collection in the College of Physicians of Philadelphia

Except for old age, infirmity, protection during walking exercises, or ceremonial purposes, the cane is obsolete for the modern physician. From the 17th to 19th centuries, however, no doctor of medicine would have been so indecorous as to pay a professional visit, let alone be seen in public, without this essential accessory. The same length as a footman's stick, smooth and varnished, with a heavy gold or siver knob or a crossbar at the top, it was a routine instrument that every prudent aspirant to clinical practice carried. The handle or knob was hollow and contained a vial or vinaigrette which the doctor always held to his nose as he approached an ill person; he believed that its fumes would not only protect him from contagion but also neutralize the foul odors in the room and the noxious exhalations of his patient. The contents of the vial could be a powder, paste, or liquid, and the perfume of the civet cat and the pomander were frequently used. The latter gave rise to the

name of "pomander cane" or "pomander stick."[4] The word *pomander* is derived from *pome* (Lat. *pomum*, apple) and *amber*, a fossil resin quite distinct from ambergris, the concretion from the sperm whale which to the present time is used in perfumery. If the physician preferred to carry liquor in his cane, one of the favorites was Marseille vinegar or "Vinegar of the Four Thieves," named because of the claim that four thieves became immune by it when they robbed the bodies of plague victims in Marseille in 1720–1721.[4]

American medicine is rooted in British tradition. Henry VIII gave the Royal College of Physicians of London its charter in 1523,[9] and The College of Physicians of Philadelphia, the oldest institution of its kind in the United States, was established in 1787.[10] While the London college prizes the most famous cane of a physician, the Philadelphia college in its Mütter Museum has 16 more recent canes which belonged mainly to prominent Philadelphia physicians.[11]

The seven gold-headed canes in the Philadelphia collection are grouped in Figure 1. The first, the latest acquisition, was awarded to Dr. Esmond R. Long in 1971 by the American Association of Pathologists and Bacteriologists.[12] It was given to the College by Dr. Long, a Fellow, in 1976. Dr. Long received international acclaim for his studies in pathology, tuberculosis, and medical history. From 1932 to 1955, as a professor in the University of Pennsylvania, he was director at the Henry Phipps Institute for study, treatment, and prevention of tuberculosis. In addition to writing 270 articles and editorials and 12 books, he was editor of three different journals and the medical portion of Webster's *International Dictionary.*

The second cane belonged to Dr. Edward T. Reichert, professor of physiology from 1886 until 1920 in the College of Medicine of the University of Pennsylvania.[13] Before he started his clinical practice, he investigated the chemical nature of snake venom, the physicochemical specificity of proteins, and the structure of hemoglobin crystals and starch grains. The cane is inscribed: "Presented to/ Dr. E. T. Reichert/ as a Token of Esteem/ Medical '87/ U. of Pa./ Dental '86." It was given to the College by his nephew, Mr. Joseph R. Stulb, in 1951.

On the head of the third cane is engraved: "D. Hayes Agnew/ May 16, 1873." Dr. Agnew (1818–1892) attained prominence as one of the finest surgeons in Philadelphia, head of the Philadelphia School of Anatomy, authority on gunshot wounds, co-founder of the Orthopedic Hospital, full professor of surgery at the University of Pennsylvania,

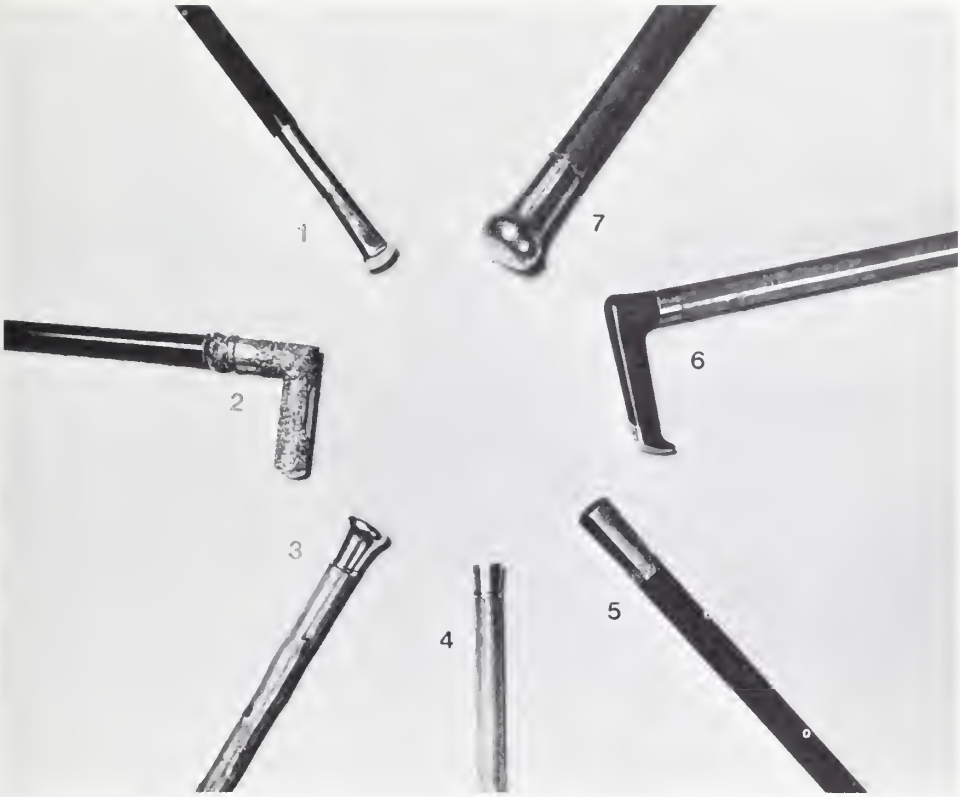

Figure 1. Gold-headed canes of (1) Esmond R. Long, (2) Edward T. Reichert, (3) D. Hayes Agnew, (4) Benjamin Rush, (5) Isaac Hays, (6) Edward T. Reichert, and (7) Samuel D. Gross (courtesy of The College of Physicians of Philadelphia).

recipient of an LL.D. degree from Princeton, and author of *Principles and Practice of Surgery*.[14] He was historically perpetuated in Eakin's painting, *The Agnew Clinic*, in 1889. Dr. DeForrest Willard, first clinical professor of orthopedics at the University of Pennsylvania from 1889 until 1911, received the cane from Dr. Agnew. In 1959 Dr. Willard's daughter-in-law, Mrs. DeForrest P. Willard of Sea Island, Georgia, gave it to the College.

The fourth cane belonged to Benjamin Rush (1749–1813). As a leading teacher and practitioner in the formative years of American medicine, Rush was the first professor of chemistry at the College of Philadelphia in 1769. He held this position for 22 years, until this oldest medical institution in the United States was reorganized in 1791 as the medical school of the University of Pennsylvania. Rush continued for

six years as professor of the institutes of medicine and distinguished the last 16 years of his life as professor of the theory and practice of medicine. His interest and writings on care of the insane earned him the title of "Father of American Psychiatry." Rush was a signer of the Declaration of Independence, a social reformer, a churchman, a founder of the College of Physicians, and the treasurer of the U. S. Mint.[10] The donor of his cane to the College is unknown.

The fifth cane is that of Isaac Hays (1776–1879).[15] For 42 years, starting in 1827, he edited and made internationally famous the *American Journal of the Medical Sciences*. In 1847, as chairman of the Philadelphia Committee on Arrangements, he welcomed the representatives of 40 medical societies and 28 colleges assembled at the old Academy of Natural Sciences to organize the American Medical Association. His code of ethics was subsequently adopted as the official one of the profession. Although best known as an editor, he was a highly reputed ophthalmologist and published in 1828 *Diseases of the Eye*. The cane was given to the College by Miss Henrietta Hays.

The sixth cane is gold-trimmed and inscribed, "To/ Professor Edward Tyson Reichert/ from/ Class of 1922, School of Medicine/ University of Pennsylvania." This cane, which was given in honor of Dr. Reichert two years after his retirement, supplements the first cane he received from students very early in his teaching career and is a tribute to the consistency of his excellence. It also was presented to the College by his nephew, Mr. Edward R. Stulb, in 1951.

The seventh cane, another archival treasure, bears the inscription: "Prof. S. D. Gross/ Philadelphia, Pa./ from/ W. T. Briggs, M.D./ Nashville, Tenn./ 1880." Gross, in a remarkable balance of superb attributes, brought worldwide recognition to American medicine and has been immortalized in art and sculpture.[16] In the undisputed position of leader of academic surgery of his era, he possessed an unflagging intellectual energy that distinguished him as teacher, investigator, writer, anatomist, pathologist, clinician, and surgeon. He served as president of the American Medical Association in 1867, one among many similar honors. His cane was donated in 1946 by the late Mr. Orville Bullitt, Gross's great-grandson, and it is exhibited in a special case on the fireplace mantel in the Gross Room of the College.

Figure 2 depicts six silver-headed and miscellaneous physician canes. The first is the silver-headed one carried by Dr. Horatio C Wood (1841–1920), who served as president of the College in 1902. He was

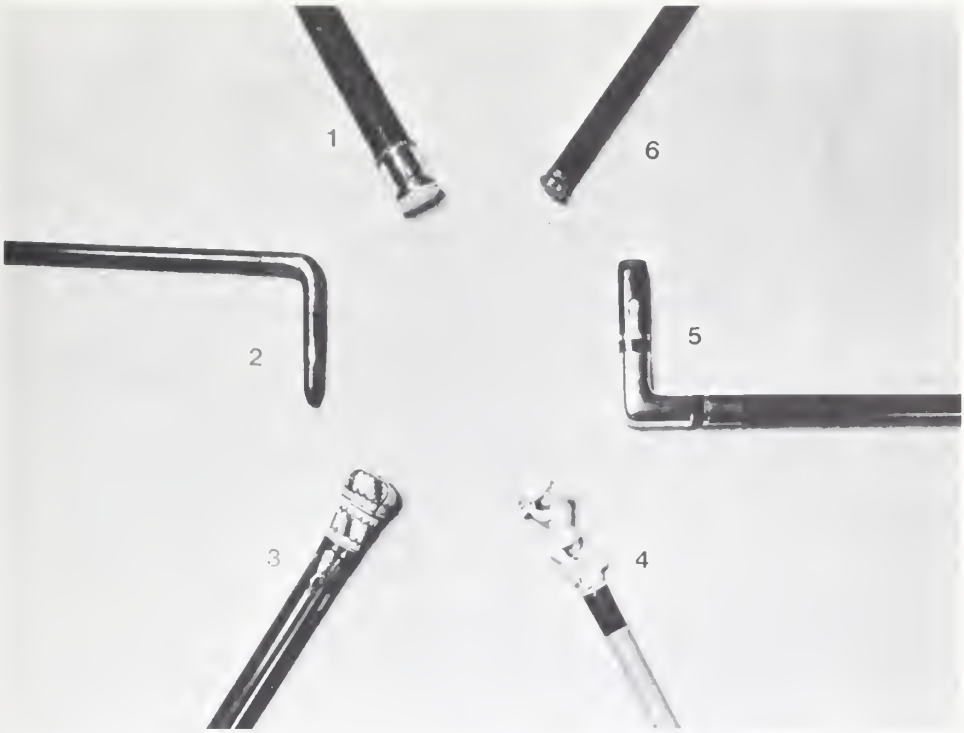

Figure 2. Silver-headed and miscellaneous canes of (1) Horatio C Wood, (2) Lawrence H. Rogers, (3) William Osler, (4) W. W. Keen, and (5 & 6) Nathaniel Chapman (courtesy of The College of Physicians of Philadelphia).

professor of botany at the University of Pennsylvania in 1866 and professor of materia medica in 1876. As one of the first Americans to study pharmacology by experimental methods, he wrote a textbook that presented the scientific basis of American therapeutics. He helped to raise funds in 1874 for the Hospital of the University of Pennsylvania, the first university-connected hospital in the United States, and he served there as clinical professor of nervous diseases for over 30 years. His cane was presented to the College by Harold Bacon Wood, M.D., on January 11, 1934.

The second cane, silver-trimmed, belonged to Dr. Lawrence H. Rogers of Trenton, New Jersey. Each member of his graduating class of 1908 from the New York University College of Medicine received such an Edwardian cane. It bears the inscription, "Dr. L. H. Rogers," and was presented in 1960 by his son, Dr. Fred B. Rogers, who currently serves on the Editorial Committee of the College.

The third cane is of the pomander type and was presented by Sir William Osler through Dr. George E. DeSchweinitz in 1918.[11] The latter was president of the College in 1910. Malloch, in his article on "Other Things—And Pomander Sticks," mentions that a collector "once expressed to the writer his extreme regret that he had not secured a pomander stick which had belonged to a medical member of the Gurney family. It came into the possession of the late Sir William Osler, who was mightily pleased when he got it."[4] Osler was a member of the Library Committee of the College during his Philadelphia years, 1884–1889.

The fourth cane, an exquisite example of the ivory-headed variety, was given to Dr. William Williams Keen (1837–1932) at Christmas, 1919, by William Hemphill Bell, M.D., Captain, Medical Corps, U.S.N. Keen ranked with Halsted and Cushing as a field marshall of surgery.[17] During his 95 years he held the professorship of surgery at Jefferson Medical College (1889–1907), successfully removed a large brain tumor (meningioma, 1887) from a patient who survived another 30 years, aided in the operation on the verrucous carcinoma in the jaw of President Cleveland in 1893, edited an eight-volume *System of Surgery* (1905–1921) which was the surgeon's bible, and served as president of the American Surgical Association (1898), the American Medical Association (1899), the College of Physicians of Philadelphia (1900), and the American Philosophical Society (1908). The cane was carved in Switzerland and represents a gnome or kobold (in German folklore, an underground being inhabiting mines and caves) holding a human skull. This curious head was affixed with a siver band to a malacca shaft. Keen presented it to the College in May, 1920.

The last two canes belonged to Dr. Nathaniel Chapman (1780–1853).[18] In 1815 he was appointed professor of materia medica at the University of Pennsylvania. Three years later he was named professor of theory and practice, institutes, and clinical medicine, a chair formerly held by Rush. Chapman was an author of widely used textbooks and co-founder and editor of the *Philadelphia Journal of the Medical and Physical Sciences*, which in 1827 became the *American Journal of the Medical Sciences* (*Hays' Journal*). He was also the first president of the American Medical Association in 1847. The fifth cane, silver-trimmed, was presented in 1932 by Mrs. Wm. R. Philler on behalf of Chapman's great-grandchildren of the Winsor and Thayer families. The sixth cane, with pinchbeck head (alloy of copper and zinc that imitates gold), was donated by Curtin Winsor, a lineal descendant on the female side of the Chapman family.

Less imposing, but an integral part of the College collection, are the wooden canes shown in Figure 3. The first belonged to Dr. Robert H. Girvin (1836–1900), secretary of the College for 17 years. He was a highly respected Philadelphia practitioner who was influential in the construction of the Presbyterian Hospital and served on its medical board. The cane was passed on to his son, Dr. John H. Girvin, and presented to the College in 1952 by Dr. Philip F. Williams.

George Milbry Gould (1848–1922) was the owner of the second cane. Like Isaac Hays, he was a highly reputed ophthalmologist, but he perhaps gained even more esteem as editor of *Medical News* (1891–1895), *Philadelphia Medical Journal* (1898–1900), *American Medicine* (1900), *American Year Book of Medicine and Surgery,* and author of a popular series of medical dictionaries. His two-volume history of his alma mater, *Jefferson Medical College of Philadelphia* (1904), remains a classic reference.[19] The cane is inscribed "G.M.G. Atlantic City, N.J. 1911–1922" and was presented by the estate of Laura Stedman Gould Dees.

Figure 3. Wooden canes of (1) Robert H. Girvin, (2) George M. Gould, and (3) John Foulke (courtesy of The College of Physicians of Philadelphia).

The last cane, with eyelet and wristcord, belonged to Dr. John Foulke (1757–1796), one of the 24 founders of the College.[10] He obtained his M.D. degree from the College of Philadelphia in 1780, lectured in anatomy at the Pennsylvania Hospital (1784–1794), and served as secretary of the American Philosophical Society (1786–1789). Foulke's cane competes with that of Rush for seniority. It was presented in 1932 to Dr. Emlen Wood by Mrs. Jean Kane Foulke for the Library of the College.

Ceremonial Gold-Headed Canes

The English tradition of the gold-headed cane presented for a different aspect of medical achievement was brought to the United States in 1919 by the American Association of Pathologists and Bacteriologists.[12] The awardees, in contrast to their British predecessors, have not been clinicians and have not acquired significant wealth through the practice of their profession. Starting with Dr. Harold E. Ernst, Professor of Pathology and Bacteriology at Harvard Medical School, each has been a teacher and devoted to research. The ceremonial award of the cane is dedicated to an American who "represents the highest ideals in pathology and medicine." Two of the recipients, George H. Whipple and Peyton Rous, were Nobel laureates.

In 1926, almost one hundred years after the original British cane came to permanent rest, the graduating class of Jefferson Medical College of Philadelphia brought another gold-headed cane into being. This was further tribute to Professor Samuel D. Gross; his name was inscribed on the handle beneath the seal of the Medical College. It was the desire of the class "to leave a constant reminder of that noble man and to link more closely with his the name of his present disciple whom we so love and revere, J. Chalmers Da Costa; also the names of those who will follow."[3] Dr. Da Costa, who was strongly imbued with a sense of history, gave the cane to his alma mater. In 1976, at the fiftieth reunion of that same class, a bequest endowed in perpetuity the placing of names of the successive Samuel D. Gross Professors on separate gold plates. The cane is on display in the archives cabinet of the Gross Conference Room of Jefferson Medical College.

In 1939 Dr. William J. Kerr, Professor of Medicine at the University of California at San Francisco, extended the symbol of the gold-headed cane to arouse in medical students a greater interest in the welfare of

patients. The senior students and faculty choose by ballot a senior student to receive the cane as well as two additional classmates for honorable mention. It is awarded during graduation week at a ceremony in which an outstanding physician gives an address, largely biographical in character, on some subject in medical history.

In 1945 Dr. James Waring instituted a similar ceremony at the University of Colorado, and Dr. Charles Stone has initiated one at the University of Texas in Galveston.[8]

The physician's gold-headed cane survives as a heritage of prestige and honor. It represents ideals that continue to reap even better service to mankind and further enrichment of medical knowledge.

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On The American Connections of Lady Mary Page Whose Last Illness is Described by the "Gold-Headed Cane"

ISAAC STARR

SUMMARY: The author traces his relationship to Lady Mary Page, Deceased, who was cited in *The Gold-Headed Cane*, a chronicle of six distinguished London physicians. Lady Mary, a victim of dropsy, sustained an imposing number of abdominal paracenteses. A number of her relatives settled and prospered in colonial Virginia.

IN April, 1922, on my return to Philadelphia after the completion of an internship in the Massachusetts General Hospital, Boston, I found that the invitations to my coming wedding to Miss Edith Nelson Page had just been put in the mail. After noting that the Page family coat of arms had been embossed on them, I filed one of the invitations in the family archives and gave no further thought to the matter for the next fifty years. The incident that reawakened my interest could not have been more unexpected.

Among the rewards which fall to the lot of doctors interested in research are the many friendships which have their genesis in common interests. Thus, my long friendship with Dr. Geoffrey Bourne of London was based on two interests which we had in common—cardiology and trout fishing. Many of my most pleasant recollections of the English countryside were generated while fishing for trout in chalk streams, such as the Itchen and the Lambourne, at Geof Bourne's invitation. I still have vivid recollections of the brilliant yellow of the clumps of marsh marigolds growing by the streams and of the drumming of the snipe, a sound so different from that made by any North American bird.

It was doubtless similar happy recollections which prompted Bourne to send me, as a Christmas present, a volume from a new edition of the well-known medical classic, *The Gold-Headed Cane,* which had just been published in London. This present could not have pleased me more, for like the great majority of American doctors, I had always known of the

Dr. Starr is Emeritus Professor of Therapeutic Research in the School of Medicine of the University of Pennsylvania. The study here reported was first given as an after-dinner speech at the Interurban Clinical Club in Philadelphia.

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existence of the book, but I had never read it. A few words of explanation will aid those reading it for the first time.

The Gold-Headed Cane was written by Dr. William Macmichael and first published in London in 1827. The cane was carried successively by five London doctors—Radcliffe, Mead, Askew, Pitcarin, and Baillie—each the most prominent medical consultant of his time. Later the cane was presented to the Royal College of Physicians, where it is still on display.[1]

The book is written in a curious manner, using a most unusual literary device—the cane is the narrator; he does the talking. (It seems improper to use the pronoun "it" for such a lively talker.) The cane accompanies his master on calls and comments on medical and political situations after he has been stood in the corner while his master examines the patients. Somehow one does not expect that such an unusual literary device would be successful, but it is so. In this style lies much of the charm of a book that provides the best account existing of what the practice of medicine was like in the era between 1700 and 1800. I will quote from the book both to acquaint present-day readers with its style and to illustrate why, when reading it for the first time, I was inspired to make this study. The reader must remember that the cane is talking.

> My master had often considered what could be the reason that, in cases of persons labouring under dropsy, when the water is suddenly drawn off, the patient swoons and frequently dies on the spot. A simple expedient occurred to him, which was this: during the operation of tapping, to make external pressure by hand, and afterwards to apply a bandage to the belly. I was present when this method was first tried in the hospital, and afterwards frequently saw it used, more especially in the case of Dame Mary Page, wife of Sir Gregory Page, Bart., who was afflicted with this disease, and died March 4, 1728, in the fifty-sixth year of her age. In sixty-seven months she was tapped sixty-six times, and had two hundred and forty gallons of water taken away, without ever once fearing the operation. This was certainly a most valuable discovery, and shows the advantage derivable from the exercise of good sense and sound judgment; for Mead naturally reflected, that the removal of the pressure of the accumulated water caused the fibres suddenly to lose the extension which they had previously acquired; and it as naturally occurred to him, that the tendency to faint could only be obviated by substituting an external support to the parts [pp. 67–68].[1]

To this, the cane adds as a footnote, "I have heard that all these particulars are carefully recorded on the monument of this dropsical lady, in Bunhill Fields."

To read this for the first time took me by surprise for two reasons. First, the name of the dropsical patient was familiar; one of my sisters-in-law was also named Mary Page. Second, the stories of the dropsical lady, the many tappings, and the record on the tombstone were also familiar to me. At first it was hard to imagine how the cane and I had come to share this information. It was certainly not through Macmichael's book, for I had never read it before. I thought that further information about the dropsical lady might lead to an answer, and I was referred by my mother-in-law to a book of Page family history, which disclosed that the story of the ascitic lady and her tomb was a tradition which had been handed down in the American branch of the Page family for many generations.[2]

Since both the tradition and the cane agreed that Lady Mary's tomb was in Bunhill Fields Cemetery, London (a graveyard for dissenters containing the remains of John Bunyan and Daniel Defoe), with the help of another English friend, Professor Henry Barcroft, a visit to this cemetery was arranged.

Lady Mary's tomb is a large stone sarcophagus, with a larger plot of grass around it than is found in most other tombs in Bunhill Fields. The account of her last illness is given on the side of the sarcophagus, in words a little different from those used by the cane to describe it; the cane has a somewhat more concise style. The number and volume of the tappings given on the tomb are identical with those reported by the cane.

Not noted by the cane, a coat of arms is sculptured on the end of Lady Mary's sarcophagus; it is greatly weatherworn, but the three martelets of the Page arms are easily made out.[2]

Lady Mary is not buried with her husband, who is interred at St. Alfege's Church, Greenwich, several miles away. A paper published by the Greenwich Historical Society leaves no doubt that Lady Mary's husband, Sir Gregory Page, was an important person.[3] He was made a baronet in the year of George the First's accession, presumably for having raised a company of soldiers to support the crown during the days of trouble with Bonnie Prince Charlie. He sold supplies to the Navy and was paid in stock of the South Seas Company, which he sold before the bubble burst. Sir Gregory built a palatial mansion at Greenwich and was described as the richest commoner in England.[3] A rubbing of the brass on his tomb shows the Page coat of arms very clearly (Fig. 1).

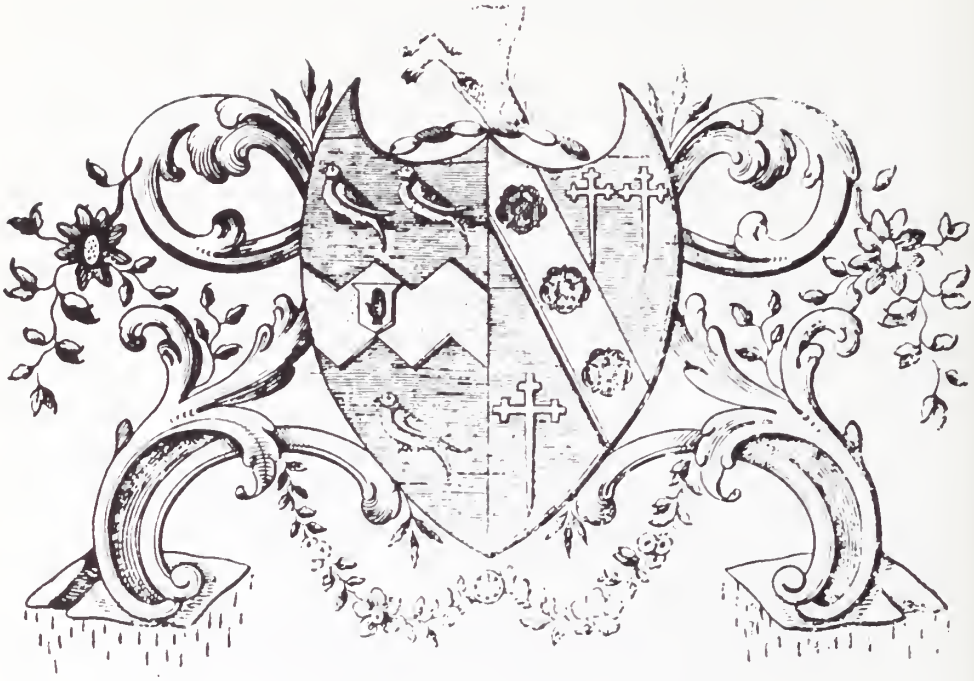

Figure 1. Rubbing of the brass plate on Sir Gregory Page's coffin in St. Alfege's Church, Greenwich. The Page coat of arms, of three martelets, appears on the left half of the shield.

About 90 years ago, a member of the Page family engaged the Somerset Herald to find out what he could about the origins of that family in England. This herald, one of the four appointed by the crown, held among his duties participating in royal pageants and maintaining a library of medieval information. It was for his latter skills that the Page family hired him.[2]

The herald succeeded far better than one had a right to expect. He located a tombstone in the yard of the Church of St. Mary in Bedfont, Middlesex, a western suburb of London, and identified it as that of Francis Page, whose dates are given. The epitaph is intriguing, "A virtuous life and a grand old age perfumed the life of Francis Page" (Fig. 2). The herald pointed out that the arms displayed on the tombstone pertain to a Page family centered about Harrow and noted in the herald's records for many years. The gravestone further testifies that Francis Page had a son, John, who was a merchant in Virginia and that this memorial to his father was John's gift.

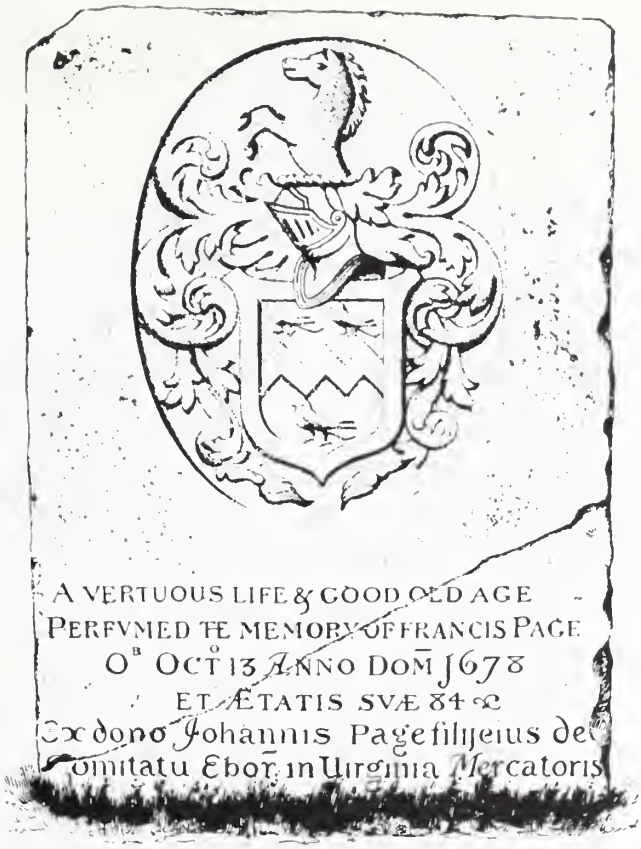

Figure 2. Tombstone of Francis Page in St. Mary's Church Yard, Bedfont, Middlesex. Note both the Page arms and that the monument was erected by John Page *of Virginia.*

It was easy to follow the Page line in North America. John Page, the donor of the stone, and his descendants prospered in Virginia; "Rosewell," the Page manor house in York Co., Virginia, was constructed in the years around 1730. It was certainly the largest and was considered by many to have been the most beautiful manor house in colonial Virginia. "Rosewell" is now a ruin, but John Page's tomb, in Bruton Church in Williamsburg, bears the same arms identified by the Somerset Herald as pertaining to the English Page family (Fig. 3).

After the Pages had lived about 100 years in eastern Virginia, the source of their wealth, tobacco, had so exhausted the soil that its cultivation was no longer profitable; so the Page family moved its headquarters west to the valley of Virginia. One hundred years or so later, one of the Pages decided to study medicine and to do so went to

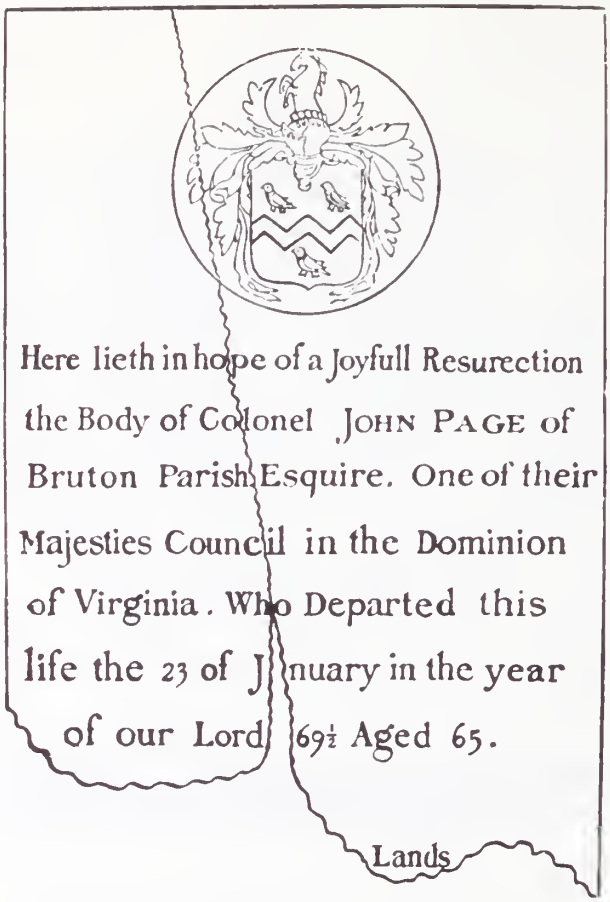

Figure 3. Tombstone of John Page in Bruton Parish Church, Williamsburg, Virginia. Note the Page arms.

Philadelphia, the country's medical center in that era. He was successful and he stayed in Philadelphia, becoming professor of obstetrics at Jefferson Medical College. In 1922 his great-granddaughter married the author of this essay and I, coming across an invitation to my own wedding which had been preserved in the family archives, found it embossed with the same coat of arms which appears on the tomb of the lady with the severe ascites in Bunhill Fields, on the tomb of her husband, Sir Geoffrey Page, in Greenwich, on the tomb of Francis Page in Medford Church Yard, Middlesex, and on many Page tombs in Virginia. You would not believe it possible!

So one must conclude that the Pages in England and in America belong to the same family and are related to, though not descended from, the Lady Mary Page whose last illness was made historic by the Gold-Headed Cane.

The cane must know far more about Lady Mary and her last illness than anyone else, for it is reasonable to suppose that he accompanied Dr. Mead on all of his 67 visits to the ascitic lady. To be sure that there would be nothing with which the cane did not agree in this report, I sought him out in his place of honor in the new building of the Royal College of Physicians.[4] He added nothing to the story related here.

The ascitic Lady Mary had no children and the title ran out; the American Pages are not descended from her. But a host of American Pages can claim cousinage, made much of in Virginia, and can join in their admiration of a gallant lady who withstood a long illness with a fortitude much admired by the Gold-Headed Cane.

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A Catalogue of the Manuscripts and Archives in the Library of the College of Physicians of Philadelphia

The College of Physicians of Philadelphia, established in 1787, is one of the oldest and largest medical libraries in the country. The founders were leading members of the American medical profession in the eighteenth century, among them John Morgan, Benjamin Rush, and Adam Kuhn. The College was from its inception a professional society along the lines of the Royal College of Physicians in London. For nearly two hundred years it has been a complement to the medical schools in the city. Its fellowship has consisted of individuals of the highest professional standing. To fulfill the aim of the College to promote the progress of medical science and the medical profession, its fellowship has created a historical library alongside its modern medical research collections which has developed into a superlative collection of medical history, the history of science, and the humanities.

The materials described in this catalogue cover a very wide range: medieval illumitated manuscripts; hundreds of eighteenth and nineteenth century European and American lecture notes; thousands of case histories; archives of institutions such as the famous Philadelphia Orthopedic Hospital and Clinic for Nervous Diseases; papers of leaders of American medicine, such as Benjamin Rush, Robley Dunglison, Samuel D. Gross, S. Weir Mitchell, Joseph Leidy, the Wistar and Wood families; archives from the Anti-Vaccination Society of America to the American Association for the History of Medicine and the archives of the College of Physicians of Philadelphia itself.

The catalogue provides access for the first time to a wealth of untapped resources. No other medical manuscript collection of comparable size has been published in such a catalogue. The bibliographic descriptions are accurate and simple, informing the researcher in a few lines about what he needs to know.

Edited by Rudolf Hirsch, Associate Director of Libraries, Retired, and Professor of History, Emeritus, University of Pennsylvania, the volume is 259 pages. It is available from the University of Pennsylvania Press for $30.00. Fellows of the College of Physicians of Philadelphia may purchase the volume at a 20% discount. ISBN: 0-8122-7817-8

Alfred N. Richards and the Discovery of the Mechanism of Urine Formation

DAVID Y. COOPER

SUMMARY: Stimulated by opposing theories on the mechanism of urine formation, Dr. Richards and his collaborators devised sampling and analytical techniques that permitted precise determinations of glomerular and tubular filtrates in the frog. These established beyond reasonable doubt that Ludwig's filtration–absorption theory applied, a discovery with far-ranging applications in anatomy, physiology, and therapeutics.

IT may not require much inventive ingenuity to arrange the kidney of a frog on a microscope stage in order to examine it, but it was this experiment that created a milestone in the history of renal physiology. This first visualization of living glomeruli in the frog's kidney opened the gate releasing ideas which led Richards, Schmidt, Wearn, and others to the experiments that first explained how the kidney formed urine.

The drive to this goal began, unknowingly, in 1903,[1] while Richards was giving a course in experimental pharmacology at the College of Physicians and Surgeons in New York. At this time he began a study of the influence of chloroform, cyanide, and other drugs on the ability of the liver to detoxify indole. This work developed from an offer to help John Howland, L. Emmett Holt's young assistant, improve treatment for a child suffering from cyclical vomiting. It occurred to Richards in the course of these studies on the hepatic detoxification of drugs that an improved and more reliable perfusion system would be a means of unlocking answers to many circulatory and hepatic problems. He therefore decided to design such an improved system.

In order to understand the depth of the problems confronting Richards during his investigations, some background in the history of renal physiology may be helpful. Bellini, a Florentine anatomist, showed in 1662 that the striations seen upon sectioning the kidney are not fibers but small tubules.[2] The small globules containing what

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appeared to be the terminations of the finest divisions of the renal artery were discovered by Malpighi in 1666.[3] He called these globules "glandulae." Malpighi deduced that urine was formed within these "glandulae" and was conducted to the pelvis through the tubules; however, he found no connection between these structures. This concept of kidney function was accepted by his successors in the following century (such as Schumlansky, in 1782).[4] In the early 19th century this mechanism began to be emphatically denied by the physiologists Johannes Müller and E. H. Weber.[5]

William Bowman, a young English physiologist, demonstrated to the Royal Society his experiments on the "glandulae" in 1842.[6] Bowman found when he injected lead acetate and potassium bichromate into the renal artery, the capillary tuft became discernable. By a fortuitous accident, he showed that the "glandulae" were connected to the tubules, when the capillaries accidentally ruptured and lead chromate not only filled the capsular space of the Malpighian body but also flowed into the tubule. On the basis of this understanding of the morphology of the urineferous unit, Bowman suggested a mechanism for urine formation. Impressed by the similarity of the membranes of the urinary tubules to those of the digestive glands, he postulated that urine was formed by a similar secretory process.[6]

Carl Ludwig, a physiologist at Marburg, repeated Bowman's experiments.[7,8] He concluded that the capillaries within the Malpighian body and their relation to the arteries supplying the kidney were arranged to insure a high capillary pressure. This high perfusion pressure permitted a filtrate to be formed from the blood plasma; this filtrate contained all components of plasma except those impermeable to passage through the capillary membrane. As the filtrate flowed through the tubule, those components required for life were reabsorbed by a process of endosmosis.

Ludwig's view of the concentration of filtrate in the tubule soon became unacceptable when the osmotic pressure of the urinary fluid was found to be higher than that of blood. To retain the filtration-absorption mechanism, it now became necessary to postulate active, selective absorption within the tubules—this absorption was described as "vital."[9]

Criticisms of Ludwig's work led Heidenhain of Breslau to studies in which he visualized the path that a substance traveled in passing from the blood through the kidney and into the urine.[9,10] He chose for his

study the renal excretion of indigo carmine, a dye which, like urea, is excreted in high concentrations in the urine and is easily recognizable by its color. A rabbit kidney excised during excretion of indigo carmen showed dye in the tubule but none in the Malpighian body. Injection of this dye into a rabbit whose kidney function had been impaired because of low arterial pressure resulted in the dye penetrating into the endothelium as well as the lumen of the tubules. Heidenhain further supported his secretory hypothesis with calculations in which he estimated how many liters of blood had to be filtered to eliminate from the body the urea formed each day. He estimated for humans the formation of 70 liters of filtrate. Heidenhain did not believe this volume could be formed by the glomerulae nor did he think the tubules could reabsorb the 68 liters of filtrate required by Ludwig's mechanism of urine formation.

These conflicting theories led Richards to his investigations. When he moved to the University of Pennsylvania as chairman of the department of pharmacology, Cecil K. Drinker came to work with him. Drinker had just graduated from the medical school at Pennsylvania, and in a few months he was to start a fellowship in pharmacology with William H. Howell in physiology at The Johns Hopkins Medical School. In the summer of 1911 Richards and Drinker constructed an improved system with which they perfused the brain of a cat for nearly two hours with no detectable damage. Just as they were having some success with this perfusion system, Drinker had to leave Richards to begin his work in Baltimore.

When Oscar Plant, Drinker's replacement, arrived, Richards suggested to him that he use their new perfusion system to find evidence explaining the mechanism of the diuretic action of xanthenes. Each year, Richards complained in his lectures to medical students that there was no convincing evidence to allow one to choose between the two main concepts of kidney function. One could explain the diuretic effect of caffeine by Ludwig's theory—it produced a greater urine flow by its dilatory action on the capillaries of the glomerular tuft. On the other hand, if secretion of the urine was the mechanism, one could state that caffeine stimulated secretion of urine in the tubules (according to Heidenhain). By using his new perfusion system to maintain a constant flow of blood through the kidney, Richards hoped he could design an experiment that would determine which of these mechanisms was correct.

Accomplishment of this goal turned out to be more difficult than originally anticipated. Richards worked long before the discovery of heparin, and the only anticoagulant approximating a physiologically inert one was hirudin (leech head extract), which was expensive, not entirely nontoxic, and practically impossible to obtain because of the outbreak of World War I. Richards, however, was able to receive from an anonymous friend sufficient material to carry out a small series of experiments using his new perfusion system. These experiments showed that after caffeine was injected into a rabbit's kidney perfused with a constant volume of blood, formation of urine increased despite a marked fall in blood pressure. This result supported the Bowman-Heidenhain secretory theory rather than Ludwig's concept of filtration and reabsorption.

Shortly after this experiment, America entered World War I. Richards was invited to join Henry H. Dale in England to help with a study on the mechanism of wound shock carried out under the auspices of the British Research Committee. This study led to a publication, one of the classics of medical literature, by Richards and Dale on the action of histidine.[11] Richards received two benefits from his war effort: 1) international recognition as a rising star in American pharmacology, and 2) a life-long friendship with Henry Dale. In 1918 he was made a Major in the U. S. Sanitary Corps and given the assignment of setting up a laboratory at Chaumont, France, to study the toxicological problems of chemical warfare. He embarked for France in September, 1918, but the equipment for the laboratory did not arrive until after the war had ended. Richards returned to Philadelphia and received an honorable discharge from the army in December of that same year.

Richards plunged immediately into the teaching program that Henry Plant and Wilson Wood had carried on for him during his absence. When the time became available, he and Plant resumed their experiments on kidney perfusion that were begun in 1915. His work with Dale on histamine had led Richards to believe that a rise in glomerular filtration could occur with a fall in renal arterial pressure. Now the idea was to test the effects of raising perfusion pressure on urine flow while maintaining a constant quantity and quality of blood flowing through the kidney. The procedures used to raise perfusion pressure were partial obstruction of the renal vein, stimulation of the splanchnic nerves, or addition of a minimally effective dose of adrenalin in the perfusing blood. In all cases tested, diuresis resulted. Richards

regarded this as strong support for Ludwig's concept of the formation of urine by filtration and reabsorption.

During a demonstration early in 1919, one of the visiting observers suggested to Richards that if he recorded the volume of the perfused kidney with an oncometer, he might obtain interesting data. Richards accepted this suggestion, and when he measured the kidney volume after injection of the minimally effective dose of adrenalin, he found that the blood pressure rose, a diuresis occurred, and an increase in the blood volume of the kidney resulted. Corresponding experiments in the limbs of a rabbit showed that the volume of blood in the leg always decreased upon administration of any dose of adrenalin that raised the perfusion pressure. These experiments convinced Richards that swelling of the kidney was more likely due to something peculiar to the organ than to the capillary-dilating action of adrenaline. Richards concluded the most likely explanation for the adrenalin paradox was that there was a relatively greater constriction in the efferent arteriole of the glomerulus than in the afferent arteriole.[12,13] Although this is routinely accepted today, in 1918 this was a revolutionary concept in renal physiology. Richards's next step was to show where arteriolar constriction occurred.

Carl Schmidt joined the department in September of 1919, and the item at the top of the agenda (next to the teaching program, which was always first in his planning) was to search for direct evidence of the ability of adrenalin to cause constriction of afferent and efferent arterioles, swelling of glomerular tufts, and increased glomerular filtration. Cushny's monograph, "The Secretion of Urine" (1917) had just become available.[14] In it he reviewed the literature and concluded that the filtration–absorption process of Ludwig was the most likely mechanism of urine formation. The whole group—Plant, Richards, and Schmidt—were diligently studying this paper to find leads for further experimentation. The next step, according to Schmidt, was that during careful study of the literature one of the group came across an inconspicuous account of a recent report of Ghiron, who claimed he had been able to follow under the microscope the course of injected dye through the kidney of a living mouse.[15] Richards encouraged them to try to repeat this finding, and when they were unable to see anything conclusive in the densely packed glomeruli in the mouse, Richards suggested they try the same experiment with a frog's kidney, which is flat and more suitable for observation under the microscope.

Perhaps the basis for Richards's suggestion can be found in his writings:

> Warfield Longcope was president of the Harvey Society during the years 1919–1920. He invited me to give one of the lectures of the following season. I accepted, having done some perfusion experiments on rabbits in collaboration with Cecil K. Drinker and Oscar Plant, which led to the belief the efferent arteriole was a contractile structure and could take part in the regulation of the capillary pressure. I thought that a description of those experiments would serve as the nucleus of a Harvey Lecture.
>
> During the months preceding the proposed lecture [while recovering in the University Hospital from an appendectomy], I read August Krogh's work on the capillaries of the frog's tongue, and the thought occurred, if Krogh could see the minute vessels in the tongue, perhaps if I tried I could see the small vessels in the frog's kidney. Carl Schmidt and I tried and found that blood vessels of that kidney could quite easily be visualized, and some of our work supported the view that the efferent vessel contracts when subjected to minute concentrations of adrenaline.[16]

This suggestion to look at the frog's kidney under the microscope was the step that brought Richards and his co-workers fame. When the frog's kidney was visualized, Schmidt and Richards observed occasional glomeruli whose capsules were distended with fluid; blood cells in thick streams coursed through the capillary loops. Circulation in some glomeruli were more active than in others, and even in a single glomerulus the activities of the various capillary loops showed varied activity. They further observed that a given capillary would pass from a period of activity with an abundant blood flow to one of total inactivity. Richards and Schmidt called this "the intermittency of glomerular activity" and concluded that in a normal kidney all of the capillaries were not active simultaneously.[17]

During these studies, the bright arc lights required to illuminate the kidney glomeruli under the microscope began to damage Carl Schmidt's eyes, so he went on to investigate other physiological questions including, during a fellowship in China, the biological effects of herbal remedies. This work led to the rediscovery and introduction of ephedrine as a therapeutic agent.[18]

Joseph Wearn, after finishing an internship at the Peter Bent Brigham Hospital and serving a year in the army, now came to work with Richards in the Department of Pharmacology. On arrival, Wearn was assigned the duties of helping prepare the animal experiments for the

laboratory exercises of medical students in pharmacology. One of the experiments was visualization of the frog's kidney. Richards taught Wearn how to prepare the living frog for observation of its glomerular circulation and gave him a copy of Cushny's monograph. He told him to familiarize himself with it and other significant literature on the formation of urine. "After you have done that, come back and we will discuss your future work."

Richards, in the meantime, had visited the laboratory of Robert Chambers at Cornell and had seen Chambers inject red blood cells with a minute glass pipette. This gave Richards the idea that he might use this procedure to inject adrenalin or pituitrin directly into the efferent arterioles and observe the changes these drugs induced. With this technique, Richards thought he might find an explanation for the adrenalin paradox as well as a mechanism for the "intermittency of glomerular activity." And it was at this time that Richards asked Wearn if he was interested in joining him to study this problem.

After reading the voluminous literature and weighing the pros and cons of the arguments of filtration-reabsorption versus tubular secretion, Joseph Wearn thought that it might be possible to puncture Bowman's capsule with a Chambers pipette and obtain some of the glomerular fluid. The fluid thus obtained could be analyzed for protein, sugar, chloride, urea, dyes, and other substances and the results could be compared with those of similar analyses of the blood and urine. This approach, Wearn felt, would give direct answers to long-standing questions of how urine is formed. Richards enthusiastically approved of Wearn's idea. That afternoon he assigned Wearn a quiet laboratory in the basement of the Medical Laboratories Building (now the Institute for Environmental Medicine—the location of this room is marked by a brass plaque). The next few days were spent gathering the necessary equipment. Soon they realized that they had to build much of it themselves, although Richards and Schmidt had constructed an adequate lighting system for illuminating the frog's kidney and had used a binocular microscope. Wearn had little difficulty drawing the glass micropipettes, which were sealed into the end of a larger glass tube. This glass tube was then firmly clasped in a Barbour's stage that could be moved in three planes with a micrometer drive; this arrangement, in turn, was attached to a Zimmerman stativ for course adjustments.

Wearn describes puncture of Bowman's capsule as follows:

> With the kidney preparation in place on the stage of the microscope and the light properly adjusted, the point of the pipette was brought into the center of the microscopic field and placed 1 mm directly over the glomerular capsule that had been selected for puncture. Through a small hypodermic needle attached to the microscope, a fine jet of air was played on the face of the kidney until the area over the glomerulus was dried. Drying facilitated the insertion of the pipette as it prevented the point from slipping over the wet surface and, at the same time, prevented contamination of the point with the overlying surface fluid.* At the time of puncture that area of Bowman's capsule was selected immediately overlying the part filled with fluid and at the greatest distance from the capillary tuft and the capsule wall. After many trials we were able to insert the pipette without touching either of the structures.
>
> When the pipette was in place inside the capsule the three-way stopcock was turned to connect the leveling bulb and the pipette and the bulb was lowered 3 cm below the level of the kidney in order to create negative pressure and draw in the glomerular fluid.
>
> When the collection of the glomerular fluid was to be terminated, the three-way stopcock was turned to close the connection between the pipette and the levelling bulb.[19,20]

The glomerular fluid was transferred to a capillary tube, the appropriate reagents added, and the tube sealed. The analyses of the capillary fluids are described in the original paper of Wearn and Richards.[19]

The direct testing of the fluid in the frog's glomerulus showed that a protein-free filtrate is separated from the bloodstream as it passes through the glomerular capillaries. The finding that two substances contained in the glomerular fluid, sodium and glucose, both normal constituents of blood plasma, were not found in urine in the bladder proved beyond doubt that the renal tubule reabsorbed these substances.

The original report of this work by Richards at the annual meeting of the American Physiological Society in December, 1921, shared the limelight with the first successful isolation of insulin.[21] Richards's work was criticized on the basis that it was done in amphibia, and the question was raised whether similar mechanisms operated in higher mammalian species. Richards's immediate rebuttal to this challenge was that he and his colleagues had tried to make these observations in mammalian kidneys but had failed. Since the frog's kidney accomplished the same functions as the kidneys of higher animals, the team decided it was

*The suggestion that drying Bowman's capsule would facilitate puncture with the micropipette was made by Dean William Pepper when he dropped by the laboratory to see what Newton Richards was doing one day.

better to investigate a kidney that could be studied than to make no measurements at all. The enthusiastic ovation that met this answer to the criticism is evidence that Richards's ideas of renal function were accepted. The final answer to this question did not come until nearly twenty years later when Arthur Walker, Jean Oliver, and Phyllis Bott succeeded in analyzing the fluid from glomerular spaces and various levels of renal tubules of kidneys of rats, guinea pigs, and opossums.[22] Their work confirmed that renal function in the frog was in all essential respects the same as that observed in mammalia.

An essential step in the progress of this work was the development of quantitative microanalytical techniques. This resulted from Richards's observation that the human eye could distinguish small color differences of fluids contained in small glass tubes 0.5 mm in diameter. These color differences were quantitated by comparing them with a series of standards contained in similar tubes. By painstaking modification of existing analytical procedures, he and his colleagues succeeded in making quantitative measurements of eleven separate urinary components in fluid collected from glomerular spaces and predetermined levels of the tubule. The substances quantitated with these microtechniques were glucose, chloride, urea, uric acid, creatinine, ammonia, total alkali, phosphate, sulphate, total molecular concentration, and protein. Similar microtechniques were developed to quantitate various foreign substances such as dyestuffs, sucrose, xylose, and inulin. These techniques introduced a quantitative dimension to these studies and pioneered the development of microbiochemistry.[22]

Now there was convincing evidence that the Ludwig hypothesis of urine formation was the main mechanism and that the Bowman-Heidenhain mechanism did not function to any great degree in the elimination of the usual waste products from the body. This pioneering work is not only the foundation of our understanding renal function in general but is also fundamental to the development of new diuretics and systems of dialysis for treatment of patients who have no renal function.

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College Portraits: The Men On The Walls—IV Horatio C Wood

JOHN L. McCLENAHAN

IN 1845, at the age of four, he entered boarding school at Westtown. Small of stature, he learned earlier than most self-reliance and the arts of defense. Later, at Friends Select School, he excelled in Greek, Latin, mathematics, and English composition. When he was thirteen, his talents attracted the notice of Dr. Joseph Leidy, president of the Academy of Natural Sciences of Philadelphia, who gave him free access to all of the institution's botanical specimens. He travelled for a time in the Bahamas and along the Rio Grande, collecting plants for the Smithsonian Institution, and at eighteen entered the medical school of the University of Pennsylvania. One year later he published his first article, a report on carboniferous flora. During the years that followed he wrote about hashish, scarlatinal dropsy, centipedes, beer, hyoscine, memory, absurdities of the law, and siphonaceous algae.

On graduating from medical school in 1862 he served internships at Blockley and the Pennsylvania Hospital before entering the Union Army. When he returned to civilian life he was appointed quizmaster of medicine, therapeutics, and chemistry at his alma mater. The same year he was named professor of botany in its auxiliary faculty of medicine. While teaching he practiced (chiefly as a consultant) and cultivated his interest in physiology, neurology, and diseases of the mind. Presently he was chosen to be professor of nervous diseases and, later, of materia medica, pharmacy, and therapeutics. In Dr. Holmes's apt phrase, he occupied "not a chair but a settee."[1]

He wrote constantly—more than 300 articles and seven books, of which at least six are classics: *Thermic Fever or Sunstroke; A Treatise on Therapeutics; The Dispensatory of the United States of America; Nervous Diseases*

1. J. B. Roth, "An Early American Pharmacologist: Horatio C Wood (1841–1920)," *Isis* 30 (1939): 41.

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and Their Diagnosis; Syphilis of the Nervous System; and *The Practice of Medicine.* He was in constant demand as an expert medical witness, a task which he executed formidably. He regularly edited a medical journal and for many years was president of the United States Pharmacopoeial Convention. He declined professorships at the College of Physicians and Surgeons in New York, Bellevue Hospital Medical School, Johns Hopkins University, and Jefferson Medical College. From 1902 to 1904 he was president of the College of Physicians of Philadelphia and, with Dr. S. W. Mitchell, persuaded its fellows of the need for a new building. In 1907 his health failed mysteriously. We hear only of a shattering and demoralizing illness (possibly sciatica or spondylitis), and in 1920 he died, a stricken giant.

Portraits emphasize Dr. Wood's high forehead, full beard, and neatly trimmed moustache. His nose was straight, the mouth firm. His expression is confident, bemused. The eyes, alert, are those of a hunter which, indeed, was his hobby, taking him to the Scottish Highlands and to the continent.

It would be interesting to know if in his travels he had any converse with Claude Bernard, the physiologist whose devotion to experiment and whose antipathy to empiricism Dr. Wood so enthusiastically shared.

His wife, Elizabeth Longacre, died in 1912. They had five children—two of their three sons were successful physicians.

So bounteous were Dr. Wood's talents and so keen his enterprise that one is pressed to arrange them in order. His contemporaries were particularly moved by his skill as a teacher and by his pioneering efforts in the infant science of physiopharmacology. But it would not do to overlook at least one concrete memorial to his efforts. In 1874, two years after the University of Pennsylvania had moved from Ninth Street to West Philadelphia, Dr. Wood was one of the principal money-raisers for the Hospital of the University of Pennsylvania. Here, for the first time, a medical school stood contiguous to a general hospital for the practical instruction of students.

Students and colleagues alike testify to Dr. Wood's skill as a forceful teacher. He was reported to be "a hard examiner" and was not above laying traps in an attempt to teach young men to think. His lectures were peppered with lively metaphor and sharp epigrams. "I'd fling a cobblestone into the center of the classroom if I thought that would

make the men remember what I believe they ought to know."[2] He drilled his flock in the discipline of observation. Few lecturers brought such flair to the clinical amphitheatre—it is of interest that few of his students took notes during his lectures. His eloquence apparently penetrated directly into their minds. He regularly introduced anecdote and humor into his discourse. In relating the importance of rest in the treatment of disease to a group of nurses, he stated, "A nurse who is continually shifting the blinds, moving about the room when there is no need for it, asking the patient whether he wants this or that, or is excessively active and alert, is a great evil . . . In one of our hospitals during the war there was a young soldier who happened to be good looking and near the door. The majority of amateur nurses that came into the room wanted to do something for him. A young lady came into the room one day and said, 'Can I not do something for you?' 'Perhaps,' he replied. 'Can't I wash your face?' 'Yes, if it will give you any pleasure, but you are the 37th that has done it today.' "[3]

As a physiologist and pharmacologist his reputation rests upon his insistence that drugs be objectively tested and classified according to their physiological effects. Against strong opposition he advocated the use of experimental animals and drew heavily upon laboratory observation of the reactions to atropine, ergot, ether, chloroform, hyoscine, and American hemp (*Cannabis sativa*). He rejected "experience" as the mother of wisdom—"verily she has been in medicine rather a blind leader of the blind."[4]

His principal clinical interest was fever in the investigation of which he won the Boylston Prize for his monograph, *Thermic Fever,* which set the pace for subsequent research and treatment of sunstroke.

Today we note with awe an intellect so broad and so versatile—and of such confidence. He was one of the last whose minds could encompass the whole of medicine and the bulk of natural science. In an age of copperplate longhand, where did he find the time for his thousands of pages of script? Surely he must be listed among the incredibly gifted men and women who illuminated the close of the nineteenth century before the catastrophe of World War I.

2. G. E. De Schweinitz, "Dr. Wood As A Medical Teacher," *Transactions & Studies of the College of Physicians of Philadelphia,* 3rd ser. (1920): 239.

3. H. C Wood, "Rest In the Treatment of Disease," *The Therapeutic Gazette,* 3rd ser. III (1887): 510–11.

4. Roth, "An Early American Pharmacologist," p. 43.

One can suppose that he would have been irked by the frequency with which a period was placed after his middle initial. His father wished him to be Horatio Curtis and his mother Horatio Charles. As a compromise he was given as a middle name, capital *C*, not to be followed by a period.

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Portrait of Horatio C Wood, painted by his son, James Longacre Wood (courtesy of The College of Physicians of Philadelphia).

Samuel Booth Sturgis
1891–1983

JOHN L. McCLENAHAN

DR. SAMUEL STURGIS died at the Chestnut Hill Hospital on August 14th, in the 92nd year of his life and 56th of his membership in this society. A country doctor, a teacher, historian, author, genealogist, army surgeon, and general practitioner, he leaves behind scores of friends and a body of legends.

Dr. Sturgis was born in Lower Merion Township on May 2, 1891. After studying briefly for the ministry at Haverford College, he turned to medicine while convalescing from typhoid fever. He received his M.D. degree at the University of Pennsylvania in 1914 and interned for one year at the Easton Hospital before volunteering for work in a country hospital in Lenoir, North Carolina. It was a mountain town in the Blue Ridge, and Dr. Sturgis made his house calls on horseback in the communities of Yadkin Valley, Brushy Mountain, Globe Valley, and Indian Grave Gap. He did the work of any frontier physician—reducing fractures, amputating, treating fever, performing autopsies and caesarean sections by the light of a lantern, and encouraging by whatever means his impoverished patients.

In 1917 with the outbreak of war, he enlisted and was sent to France after receiving a brief refresher course in neurosurgery. He was eventually named Commanding Officer of Base Hospital No. 92, where epidemic influenza was rampant. In 1919 he returned to practice on Philadelphia's Main Line, where he continued his work well past the age of 70. Dr. Sturgis was proud of his Huguenot ancestry and his ties to early Swedish families that settled along the Delaware. He was president of the American Huguenot Society and the American Swedish Historical Foundation and Museum. He was active and an officer in many genealogical and antiquarian societies and was decorated by King Gustaf the VI of Sweden in recognition of his efforts in behalf of that nation.

For many years Dr. Sturgis was director of the Department of Medical Arts of the College of Physicians of Philadelphia. In this

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enterprise he lent meticulous supervision and a generous purse to our outstanding Historical Collections.

Dr. Sturgis's first wife, Dr. Margaret Castex Strugis, died in 1962. Two years later he married Dr. Katharine Boucot, president of this society from 1970 to 1972. In addition to his widow, he left a stepson, Arthur J. Boucot, and a stepdaughter, Dr. Nancy Cummings.

Dr. Sturgis was a perfectionist in whatever field he approached. A raconteur with an omnivorous taste for life, he was exuberant and many-sided. His vision of medicine was broad and his participation hearty. We may not soon see another like him.

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William U. McClenahan
1899–1983

BROOKE ROBERTS

WITH the death of William U. McClenahan on April 23, 1983, Philadelphia lost one of its most dearly loved physicians. There are few physicians who have had as devoted a group of patients as "Bill" McClenahan and who have had patients who felt that no other doctor could ever quite replace him in their estimation or affection.

Dr. McClenahan was born on February 8, 1899, in Assiut, a city in upper Egypt. He was the first of five children of Robert S. McClenahan and Margaret Wallace McClenahan. His father, a Presbyterian missionary, was teaching at Assiut College at that time and devoted most of his life to work in Egypt, becoming President of Assiut College and then the Dean of the American University in Cairo in 1920. His mother was a graduate of the Yale School of Nursing and a remarkable woman in her own right.

Dr. McClenahan was educated in the local schools in Assiut and while there, became greatly influenced by Dr. L. M. Henry, who used to take him on his rounds when Bill was only a young boy. Both his mother and Dr. Henry's influence undoubtedly stimulated Bill to decide on medicine as a career when he was still a boy. At the age of 15, he was sent back to the United States to attend Hotchkiss School in Connecticut. Dr. Buehler, who was headmaster of Hotchkiss at that time, had been in Egypt the year before and was so impressed by Bill, who had been his guide in Assiut, that he offered him a full scholarship on the spot. Bill was graduated from Hotchkiss in 1917 and from there went on to Monmouth College in Illinois. In 1918, with our country at war, he volunteered for the officers' training corps at Monmouth and in 1919 transferred to Princeton, where he graduated in 1921. He then entered the Medical School at the University of Pennsylvania, and for an amusing account of how that came about, I would refer the reader to *G.P.*, his brief autobiography (Philadelphia: Dorrance, 1974). Philadelphia remained his home for the rest of his professional life. Graduating with the M.D. degree in 1925, he went to the Pennsylvania Hospital for his two year rotating internship and subsequently spent two years in residency, one in pathology and the other as Chief Resident Physician.

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While at the Pennsylvania Hospital, he and Dr. John R. Paul won the Alvarenga Prize of this College for their report on the changes induced in the lung by rheumatic fever, and in addition, he and Dr. Paul Bowers reported a case of functioning insulinoma of the pancreas, believed to be the first one reported in the American literature.

Following completion of his residency, he and Dr. John Gibbon, Jr., made a trip together through various clinics in Europe, and he then returned to start general practice in Chestnut Hill with Dr. Merritt Stiles. It soon became a very busy practice indeed. He joined the staff of the Chestnut Hill Hospital at that time and remained on it during the rest of his professional life, serving it in various capacities, including Chief of the Medical Staff.

In 1939 he married Elizabeth Jean Palmer who, like his mother, was a trained nurse. They subsequently had three children—Bruce, Elizabeth, and Janet—but Bruce, the oldest, did not see his father, absent in the Pacific theatre, until he was 3½ years old.

When this country went to war in 1941, Dr. McClenahan joined the Pennsylvania Hospital Unit, which became the 52nd Evacuation Hospital and was sent subsequently to the South Pacific. He served with this unit until 1944 and then was returned to the United States, where he was demobilized as a Major in 1945. An indication of his devotion to and impact on his patients is the fact that a group of wounded Japanese prisoners gave him a citation in 1943 for the care that he had given them, a task for which he had volunteered.

On returning to practice in Chestnut Hill in 1945, he soon became busier than ever. In 1954, while chief of the medical staff at the Chestnut Hill Hospital, he conceived the idea of setting up an area in the hospital where those who were most seriously ill and in need of the most intensive nursing could be brought together with all the necessary equipment and personnel—in short, an intensive care area. He presented this plan to the trustees, who received it with "strong misgivings," being concerned about the propriety of having men and women side by side in one area. When it was pointed out that if patients were concerned about matters of this sort, then they were not sufficiently ill to be in an intensive care area, the idea was approved, and the unit opened in May of 1954 as a six bed unit under the supervision of six nurses. It was an immediate success and was the forerunner of every intensive care unit in the world today. Such units are now required for accreditation by all hospitals in the United States. For this concept and other services to his

community, Dr. McClenahan was given the Chestnut Hill Award in 1966, and later Governor Shafer presented him with the 1970 Pennsylvania Award for excellence in the field of life sciences, for his establishment of the intensive care unit.

It was while he himself was a patient in the Chestnut Hill Intensive Care Unit following a myocardial infarction, that he was encouraged to tape his reminiscences by a younger roommate having the same problem. These became the basis for the interesting autobiographical recollections published in 1974 under the title *G.P.* The warmth, modesty, and humor of the author are apparent on every page, and those Fellows of the College who have not read it will be well rewarded if they take the short time needed to read this little volume. It is a most interesting and revealing book. After reading it, one knows well why the Pennsylvania Hospital gave him its Jacob Ehrenzeller Award in 1966 as one of its outstanding former resident physicians.

In 1971, Bill retired to Florida where he lived with Mrs. McClenahan for his remaining years. He was a Fellow of this College, of whom we can all be proud, and for those of us who were fortunate to have known him, one who will be sorely missed. To his wife and family, we extend our deepest sympathy.

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REVIEW

LUMSDEN, CHARLES J. and E. O. WILSON. *Promethean Fire: Reflections on the Origin of Mind.* Cambridge: Harvard University Press, 1983. 256 pp., illus. Price $17.50.

Reviewed by FRANK A. ELLIOTT

THIS book, the fifth in a series of related studies, asks four crucial questions: What is the relationship between mind and brain? Is the human mind a *tabula rasa,* a blank slate to be inscribed exclusively by environmental factors, or is it governed by its genetic endowment—or are both culture and genes involved? How has the evolution of the brain affected cultural evolution? And finally, what Promethean Fire, what event or process triggered the exponential acceleration of brain development which, starting with *Homo habilis,* so rapidly provided *Homo sapiens* with the mental capacity to transform the face of society?

In their search for answers Wilson and Lumsden return to an earlier book, *Genes, Mind and Culture,*[1] and now provide an impressive distillate of scientific evidence from many disciplines to sustain some tentative conclusions which will be of interest to sociologists, psychologists, psychiatrists, philosophers, and theologians.

At the outset they make it clear that they believe that mind is a product of brain; that, as Ferrier wrote in 1878, "The physiological and the psychological are but different aspects of the same anatomical substrate."[2] Dualism is not for them, though for some other distinguished neuroscientists, such as Wilder Penfield and Sir John Eccles, it remains an expression of hope in the existence of something spiritual which transcends mind and body. Such belief does not necessarily contradict the physiological basis of mind. Nobody who has witnessed the dilapidation of the mind which progresses *pari passu* with the degeneration of

1. Charles J. Lumsden and E. O. Wilson, *Genes, Mind & Culture* (Cambridge: Harvard University Press, 1981).

2. Ferrier, D., *The Goulstonian Lectures* (London: Royal College of Physicians, 1878).

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the cortex (in Alzheimer's disease, for instance) can doubt that mind is a product of physiological activity and that without brain there is no mind.

Some shrink from the implications of mind-brain identity (the so-called central state identity theory) such as the conclusion that all domains of human life, including ethics, have a physiological basis, or the proposition that our perceptions and thought are often biased by genetically programmed processes in the brain. Fortunately, *pace* the neobehaviorists, the genes also provide a capacity for conscious choice which can often be observed overruling the effects of cultural conditioning. The rule of the genes is not absolute.

The second question is whether the human mind at birth is a *tabula rasa,* a blank slate, receptive only to the instructions of its cultural milieu, or is it governed by genetic endowment? In the authors' view, both are involved in shaping the behavior, not only of individuals, but of societies—a conclusion which will appeal to neurobiologists but was and is unpopular with those who hold that biology is irrelevant to the social sciences or who fear that sociobiological theory has unacceptable political implications. Wilson and Lumsden deal effectively with these issues.

The authors use the term *gene-culture co-evolution* for the reciprocal reaction between genes and culture in the course of past ages. Culture, they suggest, evolves as a product of an evolving brain, which is itself liable to modification by a changing culture. This is implicit in natural selection.

Finally, how—without resort to supernatural agencies—can we account for the rapid enlargement of the forebrain in early man, an evolutionary leap which is unique in its speed and extent? Creationists have no difficulty with this, but so far science has failed to give an answer. It is understandable that once the neocortex had developed, its functional capacity might be expected to increase quickly as a consequence of the demands of an evolving culture, because it is known that both the maturation of nerve fibers and the formation of connections between cells are accelerated by appropriate external stimulation (that is, by use) and inhibited by non-use, and there is ample evidence that social stimulation promotes mental and social development.

But what caused the physical growth of the forebrain in the first place? The authors leave this question hanging. This reviewer speculates that since the growth of the brain both before and after birth is

controlled by a group of growth hormones ("somatomedins") which are genetically controlled, the initial dramatic expansion of the neocortex in early man might conceivably have been caused by an increase in the potency of growth hormones as a result of genetic mutation.[3] Was this the Promethean gift?

This book offers a generous helping of what Harvey called "the divine banquet of the brayne,"[4] and it is to be hoped that it will receive the wide readership it deserves.

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3. Sara, V.R., Hall, K., Rutter, M., Wetterberg, L., and Yuwiler, A., "Hormonal regulation of brain growth," in *Biological Psychiatry 1981*, ed. C. Perris, G. Struwe, and B. Janson (New York: Elsevier/North Holland Biomedical Press, 1981).

4. See Macdonald Critchley, "The Divine Banquet of the Brain," 285th Harveian Oration, reprinted in Critchley, *The Divine Banquet of the Brain* (New York: Raven Press, 1979), pp. 254–67.

REVIEW

DAVIS, AUDREY B. *Medicine and Its Technology.* Westport, Ct.: Greenwood Press, 1981. 285 pp., illus. Price $37.50.

Reviewed by LESTER S. KING

THE author has had a vast experience with medical instrument collections at the Smithsonian Institution, has industriously pursued their history and development, and has fully mastered the relevant areas of curatorship. At the same time she has reached out into the broader areas of medical history where instrumentation has played a significant role.

In line with this she has divided the book into three sections. The first, "Historiography," deals with the sources for the study of instruments, the important museum holdings and collections, and their development. The second, "Significant Instrumentation," takes up in detail three topics, thermometry, the stethoscope, and the concepts of the pulse and the instruments for its study. The third part, dealing with the "Impact" of medical technology, wanders over a tremendous area.

Technology embraces a vast field and the book actually deals with what the subtitle indicates—medical instrumentation. By this term Davis apparently means the tools that the physician actually uses in examining or treating patients. There seems to be a definite "hands on" connotation—something that comes into actual physical contact with the patient—the thermometer, the stethoscope, instruments for recording the pulse and blood pressure. By extension there is a brief discussion of the electrocardiograph. The cystoscope is included but not the otoscope or gastroscope. By oblique connection the ophthalmoscope is included as well as charts for color blindness and visual acuity.

The enormous technical developments in medicine where apparatus does not come in actual contact with the patient (or within his field of vision) are not included. The microscope is mentioned but receives no systematic consideration. So, too, technology has had incalculable

Dr. King, although fully retired, maintains an affiliation with the University of Chicago and devotes himself to medical history.

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importance in bacteriology and chemistry, but these are not included in "instrumentation." However, urinalysis equipment is discussed and illustrated.

The weakness of the book lies not in the description and historical account of instruments nor in the somewhat capricious inclusions and exclusions, but in the attempt to tie these in with medicine in its broader sense. This the third part of the book attempts to do. Certainly, while a history of technology is valuable in its own right, its particular value lies with the conceptual and practical transformations that technology has effected. Davis has tried to indicate this but the result leaves much to be desired.

She does discuss the way in which one science influenced another, but we get no idea whatever of the way technology affected the real practice of medicine or, equally important, the teaching of medicine or the kind and extent of medical care. Instruments permit greater precision, but we want to know how this affected the concepts of disease and its treatment. While Davis does discuss such topics as the classification of disease and the distinction between disease and health, the discussions are quite inadequate. Wherever the book deals with the conceptual aspects of medicine, it stumbles.

Then, too, the writing is verbose and often clumsy. Many details and topics are lugged into the text with only obscure relevance. There is an unhappy lack of synthesis and unity, as if the author has amassed an enormous quantity of notes and references and was determined to use every last one of them, come what may.

The book would have been much better had the author restricted herself to the areas where she does indeed have a profound mastery. She intended the book to "open up discussion of the subject" of medical technology. This it will undoubtedly do, for it illuminates the real importance of the subject.

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REVIEW

HABER, CAROLE. *Beyond Sixty-Five, The Dilemma of Old Age in America's Past.* New York: Cambridge University Press, 1983. 181 pages, index. Price $19.95.

Reviewed by JANET GOLDEN

WHEN charting the politics of old age in 20th-century America, one finds increasing success in efforts to guarantee social security to the elderly. The quiet old-age pension reform movement after World War I and the depression era plan of Dr. Francis E. Townsend for supplying the elderly with a monthly stipend appear in retrospect to have been unpropitious efforts. The passage of the Social Security Act in 1935, on the other hand, seems a logical part of the reforms of the period, while the inauguration of the Medicare program in 1975 can only be viewed as long overdue. Today we find the pace of legislative activity increasing, in part out of economic necessity. Recently there have been debates about Social Security reform and a number of new programs and services designed to aid the elderly have been proposed or are underway. The steady growth of federally funded programs over the course of the century reflects what many have come to call "the greying of America."

Demographers (and our social security payroll deductions) have kept us well aware that the elderly population is growing. More significantly, the number of those over age 65 as compared with those between ages 18 and 64 (the "elderly dependency ratio") has increased, and the cost of caring for the elderly places a heavy burden on individual families and the society as a whole.[1] The economic and social adjustments

1. According to the *Sourcebook On Aging*, "between 1900 and 1970 . . . the total population of the United States grew to almost three times its size in 1900 while the older part grew to almost seven times its 1900 size—and is still growing faster than the under-65 portion." The ratio of those aged 65 and over to those aged 18 to 64 is expected to grow from 17.6 in 1975 to 19.0 in the year 2000. While this is not a major increase, it will raise the already significant costs of services and payments to the elderly. See *Sourcebook On Aging* (Chicago: Marquis Who's Who Inc., 1977), p. 8.

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resulting from the aging of the population and the awareness of elected officials that the elderly are active in the voting booth have prompted new legislative efforts.

Despite the legislative initiatives and social programs designed to aid the elderly and to acknowledge the aging of the American population, the popular tendency is to view those over 65 not as a political bloc or demographic cohort, but rather as an enfeebled and socially useless collection of individuals. Similarly, it is widely assumed that the elderly are denied the respect they deserve and shunted aside in a society which seems to cater to the young.[2] The paradox of the increasing political clout of the elderly and their continued low social status and estrangement from the mainstream of social life seems mystifying. Further confusing the issue is the perception that only a few generations ago the elderly were revered for their knowledge, treated with deference, and living in close, multigenerational families.

Carole Haber in *Beyond Sixty-Five, The Dilemma of Old Age in America's Past* accounts for our contemporary image of the elderly and for the false nostalgia that taints our perceptions. As Haber is quick to point out, social regard for the elderly always reflected their economic, social, and demographic position. In colonial society wealthy women and men could command the attention and respect of their offspring in part because of the land and other assets they possessed. Elderly paupers supported by the community were hardly treated with equal deference. Beginning in the nineteenth century, however, the elderly increasingly came to be viewed as a group apart.

Haber traces the modern concept of superannuation—by which we classify the elderly as unfit to fully participate in society—to nineteenth century physicians, charity workers, and managers of welfare institutions.[3] These professionals, who daily confronted old people in straitened circumstances or in poor physical condition, helped to create the

2. John Gordon Freymann, for example, in *The American Health Care System: Its Genesis and Trajectory,* describes the elderly by noting: "Their experience is little valued by a society oriented toward youth and expanding technology. They have little place in a society of mobile conjugal families. They face decades of life without a future. The only contribution many can make is to serve as a commodity feeding such booming industries as nursing homes and retirement villages. . . . " (Baltimore: Williams and Wilkins, 1974), p. 73.

3. The term *superannuated* goes back to the 17th century. Haber's contribution is the explication of its modern meaning and function.

contemporary perception that the elderly are a separate class. It was a notion born out of social reality as well as professional self-interest. The currents of the great economic transformation of the nineteenth century, which took many people off the land and made them dependent upon wage employment in an industrial labor force, left a substantial number of the elderly without a means of support or a place of retirement. The demographic transition saw a declining family size in the nineteenth century and left elderly people with few children to contribute to their support. Thus a growing segment of the elderly population confronted impoverishment or total destitution.

Beginning in the late nineteenth century, social scientists conducted statistical studies documenting the relationship between poverty and old age. The causal factor, they concluded, was the diminishing efficiency of the older worker—a widely accepted explanation. Haber discusses two social responses which followed. One was the pension plan, which had decided advantages for the companies involved, since it coerced greater employee loyalty. It also appealed to trade unions because it codified the seniority system. The other result was the old age home. Elderly people with sufficient funds and proper background could escape the stigma of the almshouse but, like their less fortunate peers, spend their final years segregated from society. In offering greater economic security, both the pension system and the old age home helped to further classify the old as superannuated.

Haber is to be commended for placing her analysis within a socio-economic framework. Though her emphasis is on the ideas developed by professionals, she determines precisely which economic, social, and demographic factors brought the plight of elderly to their attention. She makes use of a variety of sources including institutional records, diaries, and the writings of leading individuals whose decisions and pronouncements helped to shape popular perceptions of the elderly. Moreover, Haber is unique amongst social historians in her exploration of nineteenth century medical theories about old age.

Haber delineates the ways in which physicians used physiological evidence of decay in the elderly to develop new schemes for understanding old age. The discoveries of the French clinicians (Magendie, Charcot, among others) regarding the pathological anatomy of old age led to the belief that degeneration was inevitable. In America discussion centered on the climacteric, a period and a condition marking an individual's fall from maturity into the steady decline of old age or senescence. By the

late nineteenth century physicians contended that to be old was to be diseased. According to Haber, doctors recommended that "the person's only hope was to withdraw from society and submit to the physicians' custodial care" (p. 80).

The implication is that the major accomplishment of nineteenth century geriatric medicine was to rationalize medical responsibility for the elderly. However, Haber neglects two critical factors which would bolster her thesis: the role of the ordinary practitioner, and the effects of the growing number of elderly people in institutions. The typical nineteenth century physician, though unable to treat any specific conditions appearing in the elderly (a point which Haber makes) was nonetheless prepared to prescribe various tonics and nonspecific regimens and to collect a fee.[4] Financial and professional self-interest as well as scientific discoveries undoubtedly promoted the medical model of old age. A second source of medical interest derived from the increasing number of elderly people residing in almshouses, asylums, and hospitals, where they came under medical supervision. Institutional service increased the familiarity of doctors with the medical problems accompanying old age and probably justified their claim to expertise in caring for elderly people. The resulting medical model of old age was perhaps unduly pessimistic because of the generally poor physical and mental state of the institutionalized elderly, but it was in keeping with recent clinical findings.

Haber concentrates her analysis on the parallels between the social worker's and the physician's model of old age. Both encouraged the public to view the elderly as superannuated, with social workers documenting the links between old age and dependency and doctors asserting a relationship between old age and illness. But the differences in political power and ideology of the two professional groups were to have important ramifications, and so deserve comparison.

The Social Security Act establishing old age assistance as a right was legislated four decades before Medicare legislation gave the elderly assistance in paying for medical and hospital care. Social workers were,

4. On 19th-century therapeutics, see William Rothstein, *American Physicians in the Nineteenth Century: From Sects to Science* (Baltimore: Johns Hopkins University Press, 1972) and Charles E. Rosenberg, "The Therapeutic Revolution: Medicine, Meaning, and Social Change in Nineteenth-Century America," in Morris T. Vogel and Charles E. Rosenberg, eds., *The Therapeutic Revolution* (Philadelphia: University of Pennsylvania Press, 1979), pp. 3–25.

by the 1920s and 1930s, depicting the elderly poor as incapable of rectifying their condition and therefore deserving of aid. Like the young and the disabled, the elderly were to be excused from the traditional moral injunction to avoid dependency through hard work.[5]

By contrast, physicians, although willing to portray all elderly people as probable victims of chronic diseases requiring medical attention, did relatively little on a programmatic level to insure that all who fell ill received the necessary medical care. The medical model of old age had the effect of enhancing the power of physicians without benefitting the elderly. Collectively physicians fought to prevent passage of legislation guaranteeing the elderly financial access to hospitals and doctors. The American Medical Association actively opposed Medicare legislation and introduced its own "Eldercare" plan in an attempt to thwart the efforts of Medicare proponents.[6] Had Haber considered the divergent paths of the social and medical models for assisting the elderly in the twentieth century—one favoring federal involvement, the other decrying federal intervention—she might have explored with greater vigor the variations in social and medical perceptions of old age.

Beyond Sixty-Five contains remarkable insights into the elaboration of modern ideas about the elderly and an exquisite analysis of the historical development of the concept of superannuation. It is the best kind of history, providing a provocative explication of past developments in a context which suggests a framework for future research. Historians, sociologists, and gerontologists will, from now on, turn to this book in order to gain an understanding of the evolution of the contemporary social welfare system serving the elderly, and of economic and demographic influences on this system. They will also look to this work when tracing the opinions of those who, in the nineteenth century, responded to the changing social position of the elderly by creating new ideas about their proper role and proper place.

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5. On Social Security, see W. Andrew Achenbaum, *Old Age in the New Land, The American Experience Since 1790* (Baltimore: Johns Hopkins University Press, 1978), pp. 107–141.

6. On the opposition of the American Medical Association to Medicare, see Rosemary Stevens, *American Medicine and the Public Interest* (New Haven: Yale University Press, 1971), pp. 438–43; Robert Stevens and Rosemary Stevens, *Welfare Medicine in America* (New York: Free Press, 1974), pp. 45–51; and Paul Starr, *The Social Transformation of American Medicine* (New York: Basic Books, 1983), pp. 368–70.

ACADEMIA

Items of Interest from Philadelphia Medical Centers

The Osteopathic Medical Center of Philadelphia. The first Dr. Ethel D. Allen Memorial Scholarship, established through a grant from the William Penn Foundation, has been awarded to *Beth N. Fisher* and *Joyce L. Lea,* first year students. In recognition of Dr. Allen's public service and political activism, the grants of $5,000 each are given to first year minority women students, preferably from Philadelphia.

There are 215 members of the Class of 1987. This is the largest enrollment in the history of PCOM as well as the class with the greatest number of women (72, or 33.5%). Of the total enrollment, 81% are students from Pennsylvania and the remainder reside in 12 other states.

A course in Nutrition, taught by Visiting Professor *Visek Willard, M.D., Ph.D.,* and a course in Geriatric Medicine, coordinated by *John Angeloni, D.O.,* Chairman of the Department of General Practice, have been added to the second-year curriculum.

Hahnemann University. On October 1, 1983 *Dr. John R. Beljan* took up his duties as Provost and Vice President for Academic Affairs and Dean of the School of Medicine. Dr. Beljan, a native of Detroit and a graduate of the University of Michigan and its medical school, was trained as a surgeon but has spent recent years as a specialist in aerospace medicine for the U.S. Air Force Medical Corps. He was associated with the University of California at Davis and Wright State University School of Medicine before coming to Hahnemann.

The University has joined with Boston University's College of Liberal Arts to create a six-year program which leads to bachelor of arts and doctor of medicine degrees. Qualified students, after studying for two years and two summers at Boston University, will be able to continue their education at Hahnemann's School of Medicine. Students will receive their B.A. degrees after two more summer periods of study at Hahnemann and their M.D. degrees after completing the course.

Thomas Jefferson University. The Jefferson Decade Fund Drive has been launched to raise $65 million between 1980 and 1990. Its purposes are: to increase endowment funds for professorships; to underwrite loans, scholarships, and fellowships; and to finance medical research. Twenty-two million dollars are to be allocated to improve facilities and academic support services.

In June, 1983, a three-year residency in Emergency Medicine was begun under the direction of *Joseph A. Zeccardi, M.D.*

John Y. Templeton, III, M.D., Professor of Surgery, was inaugurated as President of the Pennsylvania Medical Society on October 22, 1983.

A portrait of *Charles Fineberg, M.D.,* Professor of Surgery, has been presented to the faculty. *Nelson Shanks* was the artist.

A portrait of *Simon Kramer, M.D.,* Professor and Chairman of the Department of Radiation Therapy in the Treatment of Cancer and the university's first

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Distinguished Professor, was recently presented to the univeristy.

The month of December, 1983, was set aside to commemorate the 150th anniversary of the birth of *Carlos Finlay, M.D.,* a Jefferson Medical College alumnus who identified the mosquito carrier of yellow fever.

The Medical College of Pennsylvania. "CUPID", a computer program, has been programmed as a teaching device in the management of patients with cardiac arrest. The program was developed by *Michael Barrett, M.D.,* Clinical Associate Professor of Medicine.

A program funded by the Ford Foundation has been organized to assist and counsel teenage fathers.

An affiliation has been formed with Haverford State Hospital for the purpose of training psychiatric residents in the investigation and management of chronic mental disease.

George Simpson, M.D., has been appointed Director of Clinical Psychopharmacology. A fellow of the Royal College of Psychiatry, Dr. Simpson last served as Director of the Adult Psychiatric Clinic at the University of Southern California in Los Angeles.

A grant of $3.2 million, given by the National Heart, Lung and Blood Institute, will be used to study cellular and molecular biology of lipoprotein metabolism and its relationship to coronary artery disease. The principal investigator is *Julian R. Marsh, M.D.*

A Behavior Therapy Clinic, under the direction of *Alan S. Bellack, Ph.D.,* will undertake short-term treatment of stress problems in children and adults.

Marian F. McNamara, M.D., has served as President of the medical and dental staff since July 1983.

A new radiological device, the CT-guided Leksell Stereotactic System, is being used by neurosurgeons to locate and specifically define biopsy targets within the brain.

Steven J. Davidson, M.D., Clinical Medical Director of the Emergency Medical Services Systems in Philadelphia, will train and supervise paramedics in new methods of patient evaluation and treatment.

University of Pennsylvania School of Medicine. *Clyde F. Barker, M.D.,* has been appointed John Rhea Barton Professor of Surgery and Chairman of the Department of Surgery. Dr. Barker is also the Donald Guthrie Professor of Surgery.

Brooke Roberts, M.D., formerly Acting Chairman of the Department of Surgery, will teach surgery and anatomy and serve as Chief of the surgical outpatient department and Chairman of the School of Medicine's long-range planning committee.

Dean Edward J. Stemmler, M.D., has been installed as Chairman of the Council of Deans of the Association of American Medical Colleges.

A biomedical library, funded by the William Penn Foundation, will participate in an electronic journal experiment to foster telefacsimile access to interlibrary materials.

Six endowed professorships were established during the past year: The Sylvan Eisman Professorship in Medicine, the Henry K. Pancoast Professorship in

Research Oncology in Radiation Therapy, the Harold Scheie Professorship of Research Ophthalmology, the Francis C. Wood Professorship in Medicine, the Horatio C Wood Professorship for Research in Anaesthesia, and the Ruth Van Meter and J. Ray Van Meter Professorship in Neurology.

A cyclotron is to be built close to the Medical School Laboratories at a cost of $2.7 million. It will produce radioactive elements for medical research, with particular application in techniques of positron emmission tomography.

Theodore Krupin, M.D., has been named head of the glaucoma service at the Scheie Eye Institute. He was formerly Professor of Ophthalmology at the Washington University School of Medicine in St. Louis.

On July 1, 1983, *Harold Scheie, M.D.,* retired from active practice. He continues as consultant and fund raiser for the Scheie Institute's teaching and research endowment fund.

The Scheie Eye Institute, the Children's Hospital of Philadelphia, and the Hospital of the University of Pennsylvania will take part in a nationwide study of diabetes control and complications. A joint venture of the National Institutes of Health and 21 medical centers in North America, the program will be under the supervision of *Alexander J. Brucker, M.D.*

Temple University Health Sciences Center. *Wallace P. Ritchie, Jr., M.D., Ph.D.,* formerly Professor of Surgery at the University of Virginia Medical School, has been named Professor and Chairman of the Department of Surgery at Temple University School of Medicine.

Rose M. Mohr, M.D., Director of the Chevalier Jackson Clinic, has begun a program of post-laryngectomy speech using the Blom-Singer tracheoesophageal puncture technique. The technique promises an early restoration of verbal communication after removal of the larynx.

Kenneth Cundy, Ph. D., Professor of Microbiology and Immunology, has been appointed epidemiologist at Temple University Hospital.

Laser is being applied to bladder surgery as part of an interdisciplinary program headed by *Barry Stein, M.D.*

Sol Sherry, M.D., has been named the first Distinguished Professor of Medicine at Temple University.

James T. Demopoulos, M.D., has been appointed Professor and Chairman of the Department of Rehabilitation Medicine.

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TRANSACTIONS & STUDIES
OF
THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

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The Sociopsychology of Work Ethics

ANTHONY CAMPOLO

SUMMARY: The doctrines of Predestination, Calling, and Thrift, flowers of Calvinism with roots in Hebrew scripture, deeply influenced nascent capitalism with their intimations that human virtue is the product of dedicated work culminating in and measured by material success. Late results of this ethic raise serious questions for young and old alike, touching upon the enjoyment of life for its own sake, the justification of leisure, and attitudes toward death.

THE Protestant work ethic is the idea that I want to deal with first. I want to deal with a variety of topics in this presentation, but the Protestant work ethic is the first because most people who are facing retirement have been reared on the Protestant work ethic, and this creates very special problems in retirement. Now, when I talk about the Protestant work ethic I obviously do not mean you have to be Protestant in order to be influenced by it. Jewish people and Catholic people in America are highly influenced by the concept. As a matter of fact, Lensky did a study in Chicago among Roman Catholics and found, so far as work ethic is concerned, Roman Catholics in Detroit were more committed to the Protestant work ethic than Protestants. Furthermore, the impulse to a large degree was derived from Jewish principles.

Max Weber, the great German sociologist who surveyed the continent of Europe, recognized differences between Protestant nations and Catholic nations. The Protestant nations seemed to be more industrious and more productive. They tended to be nations that accumulated vast amounts of capital and their people were intensive in their labor pursuits.

Anybody who has ever been to Geneva or Zurich knows of what I speak. Everything and everybody works in Switzerland. There is no inefficiency.

I was in the train station in Zurich on my way to Rome and the efficiency of the place was overwhelming. Everything was polished, everything was clean, everything worked properly. (When the Swiss say

Dr. Campolo is chairman of the Department of Sociology at Eastern College. This paper was the keynote address at the first Medicine and Society Seminar, held at the College of Physicians of Philadelphia on October 20, 1983. Publication has been possible in part by a grant from the Meyer H. Goldman Foundation.

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that a train is going to leave at 10:05, the train leaves at 10:05. Efficiency created by the Protestant work ethic is evident even with train schedules.) The train left Zurich on its way to Rome, but on the way it had to make a stop in Milan in order to change engines. The train sat for three hours in the Milan station because a substitute engine could not be found. What was even more upsetting is that nobody seemed to care. Passengers pulled out bottles of wine and loaves of bread, and one man even produced an accordion. Almost instantly they created a party atmosphere.

I asked the conductor, "What's going on?"

He said, "We can't find any engines."

"Is anybody looking for one?"

"I don't know."

Nobody cared. The lackadaisical manner of the Italian culture to the very, very uptight work orientation of the Swiss was a relief to experience.

The accumulation of wealth has a particular meaning within the Protestant societies that it does not have in the Catholic societies. This was a noticeable difference noted by Max Weber. He observed that nations that are Protestant seemed to accumulate more capital than nations that are Roman Catholic. We began to ask the question, why?

In his classical work (I guess everybody has it on the shelf, even if they haven't read it), *The Protestant Ethic and the Spirit of Capitalism,* Weber points out that Protestants, particularly the Presbyterians, have a strange theological doctrine—the Doctrine of Predestination—which is conducive to creating a work ethic. This holds that God knows everything before it happens, and that everything God knows must happen. Since God knows everything about a person's life before he or she is born, the person has no alternatives. It raises one difficult question: can anyone be quite sure whether he or she has been elected for salvation or whether he or she has been chosen for damnation?

What has been the traditional answer to that question? What has been accepted in Protestant societies as the sign that one is in God's favor? Here it is: The evidence of divine election, the evidence that a person is in the right relationship with God, is through economic prosperity. Economic prosperity is evidence of divine election. A person knew whether he was godly or whether he was not godly by whether or not he got rich. Now, interestingly enough, they picked up that style of thinking from the Hebrew Bible. In the Hebrew Bible it is

clear. When Israel is right with God, what happens to Israel? It prospers. When Israel is not right with God, what happens to Israel? Hard times.

In a sense, Puritanism simply picked up the cosmology of the Hebrew Bible and brought it into Christianity. The Puritans concluded that if you're right with God, you'll prosper; if you're not right with God, you will not prosper. You will know whether or not you're selected for God's salvation because your election will be demonstrated in terms of prosperity, which is achieved through labor.

This is very important in the whole retirement syndrome. Please note the values in this: prosperity through labor is the sign that you are godly—a good, decent person. If you are not into productive work, or if you are not producing wealth through industry, you are therefore going to face an identity crisis. One will be forced to ask, "Who am I? What is my standing with the Almighty?"

The next principle which John Calvin taught, and which his successors taught even more so, was the doctrine of a calling. This doctrine suggests the vocation of any person should be viewed as a service to God. Perhaps you have heard the expression "calling" bandied around. It's often used for clerical types—rabbis and ministers and missionaries. Religious leaders are always told that they are supposed to have a "calling" for the work that they do. This work is a calling of God. Religious work is viewed as a mission of God. The person who sees himself or herself as "called" recognizes that work is not simply the means of economic survival; it is a commission from God.

Robert Merton, the great American sociologist and for years dean of American sociology, did a classical study pointing out the paradox that secularism in America was created by religion. What happened was that a number of religious scientists, particularly in Calvinistic traditions, came to see their role as scientists as a divine calling. Therefore, they committed themselves to the scientific enterprise believing that research was a duty ordained by God. However, the very things that they uncovered in their research raised very serious questions about religion, which motivated them to do the research in the first place. In short, Calvinistic religion provides an intense motivation for work because work is seen as a calling, but the work that was done by the scientists who were motivated by their religiosity ends up undermining the very religion that oriented them to this work in the first place.

In Catholicism a person who wanted to serve God left his or her job and went into the monastery or convent. In fact, Catholicism encouraged people to leave their jobs and serve God in the religious vocations. It was Protestantism that said, "If you're going to serve God, you go back to work and commit yourself to your job with enthusiasm hitherto unknown because you now should recognize that you are not working for your employer, you are working for God."

The last element of the Protestant work ethic which we must consider is the doctrine of thrift. The Protestant work ethic taught that not only is a job a divine calling and the production of wealth a sign of election but, lastly, you must never spend your money. The doctrine of thrift is the last element of the Protestant work ethic.

It is easy to see why this work ethic produces a great capitalistic society. If people are working intensively because it's a sign of election to produce wealth through industry, if they look at their jobs as a calling of God, and if they make a lot of money (usually such orientations produce wealth) but this money is not spent, there will be accumulations of capital. Instead of spending money, the Puritan Calvinistic tradition prescribes that money should be invested. Most of us were raised on this parable from the Bible:

> And unto one he gave five talents, to another two and to another one; to every man according to his several ability; and straightway took his journey. Then he that had received the five talents went and traded with the same, and made them other five talents.
>
> And likewise he that had received two, he also gained other two. But he that had received one went and digged in the earth, and hid his lord's money. After a long time the lord of those servants cometh, and reckoneth with them. And so he that had received five talents came and brought other five talents, saying, Lord, thou deliveredst unto me five talents: behold, I have gained beside them five talents more. His lord said unto him, Well done, thou good and faithful servant: thou hast been faithful over a few things, I will make thee ruler over many things: enter thou into the joy of thy lord.
>
> He also that had received two talents came and said, Lord, thou deliveredst unto me two talents: behold, I have gained two other talents beside them. His lord said unto him, Well done, good and faithful servant; thou hast been faithful over a few things, I will make thee ruler over many things: enter thou into the joy of thy lord.
>
> Then he which had received the one talent came and said, Lord, I knew thee that thou are an hard man, reaping where thou hast not sown, and gathering where thou hast not strawed: And I was afraid and went and hid

> thy talent in the earth: lo, there thou hast that is thine. His lord answered and said unto him, Thou wicked and slothful servant, thou knewest that I reap where I sowed not, and gather where I have not strawed: Thou oughtest therefore to have put my money to the exchangers, and then at my coming I should have received mine own with usury. Take therefore the talent from him and give it unto him which hath ten talents. For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath. And cast ye the unprofitable servant into outer darkness: there shall be weeping and gnashing of teeth. [Matt. 24:15–30]

I belong to a Black church in West Philadelphia that has many poor people as members. One evening at a prayer meeting our pastor was reading this parable and when he got to that line that reads, "To those who have shall be given and from those who have not shall be taken away, even that which they have," a dear woman behind me mumbled to her friend, "Don't tell me Reagan don't read the Bible."

The stewardship of not wasting wealth is a crucial dimension of the Protestant work ethic. You do not waste your money on pleasure. You do not spend your money on a good time. Money must be invested to accumulate more money. The accumulation of wealth will, in our cultural milieu, establish the moral stature of the person who possesses it.

You can see that these values affect the retirement mentality to a high degree. Max Weber points out, and it has to be carefully noted, that within the American society the Protestant work ethic and its implied value system have become divorced from their religious moorings. In short, the Puritans created an ethos, but once having been created, this ethos has perpetuated itself within our culture without religion. Consequently, people who are the most Protestant in their attitude towards work may have no religion whatsoever. Such persons may be totally secularized. To make this point Max Weber points to Benjamin Franklin as a philosopher in the American society that helped America to move the Protestant work ethic from its religious moorings and put it into secular terms. It was Benjamin Franklin who secularized the Protestant work ethic and made it part of what it means to be an American. Benjamin Franklin articulated the Protestant work ethic without mentioning God. The "Poor Richard" proverbs exemplify this: "A penny saved is a penny earned," "A stitch in time saves nine," or "A rolling stone gathers no moss." And so it was that the values

inherent in the Protestant ethic were communicated to our culture and have been a part of our ethos ever since. These values which have their origins in religion still exist even when people aren't religious.

When people begin to face retirement, the Protestant work ethic creates trauma for them. First of all, retirement takes away work that produces wealth. We all know that there are many lovely things that people can do after retirement but few of those things produce wealth. These activities may be fun and fulfilling but if they do not produce wealth for people who have been conditioned by the Protestant work ethic, the person is denied the means that establish his or her worth as a human being. Remember, the production of wealth is evidence of one's goodness, of one's divine election, of one's worth. To be economically non-productive and to be spending money instead of producing money is almost a crime.

Some years ago my daughter and I were taking the Gray Line tour of Chicago. We travelled to a theater in the Tower Town section of the city. There the tour guide pointed to an alley alongside the theater and said, "Ladies and gentlemen, do you see that alley? It was in that alley that John Dillinger was gunned to death by the FBI. And when they finally killed that gangster, when they finally slew the man who had robbed over $300,000 from banks throughout the Midwest, it was discovered that he had squandered all that money. He had wasted his money in riotous living. When he died he only had 32 cents left to his name."

From $300,000 all he had left when he died was 32 cents.

And my daughter, in a whisper that was audible to everyone on the bus, said, "What great timing."

The point of the story is that to be without wealth, to not be engaged in accumulating wealth right up until the end of life is considered tragic. The American who is facing retirement is horrified at the prospect of not being gainfully employed and of dying penniless. Such orientations to wealth and work are being propagated more today than ever before. Religious television programs communicate such beliefs everywhere. The PTL Club, that's Praise the Lord Club, headed up by Jim Bakker, is now the most watched television program in the world. Add to that the 700 Club put on by Pat Robertson, and the Jimmy Swaggart program, and you realize that religious programs are coming to dominate television. These programs, mostly watched by elderly people, communicate the Protestant work ethic in its purest

form. As a matter of fact, the listening audiences of these particular religious programs tend to be skewed in the direction of people over the age of 55. Consequently there's a whole value system being communicated via the media to which we have not been paying attention. This religious programming does not significantly affect the Jewish community, but it does significantly influence the elderly in the Roman Catholic and the Protestant communities who watch these programs many hours each day.

These programs carry a theme that is reminiscent of bygone generations: if you're not a hard-working person, if you're not productive, if you're not producing wealth, you're no good. On these religious T.V. programs you will hear condemnation of the welfare system and a promotion of self-reliant industry. Many T.V. evangelists, particularly Jerry Falwell of the influential Moral Majority, want to destroy the welfare system and most other kinds of social services. They teach that godly people work and do not go on welfare; a healthy person not producing wealth is a person who is worthless and ungodly.

The average person raised on the Protestant work ethic doesn't know how to relax when he or she stops working. Even before retirement, relaxing is a problem. For instance, some years ago I was asked to do a critique of the new sex manuals that were being produced for popular use. The most popular of them was *Everything You Wanted to Know About Sex and Were Afraid to Ask.* There were a host of similar books with more or less intriguing titles. I tried to look at these books from a sociologically analytical perspective and suddenly it dawned on me what these books were about. I remembered that David Reisman had once said that sex was the last frontier, the one place where the Protestant work ethic had not invaded. It was a place of spontaneity, relaxation, and fun, and that nobody cared whether he or she was measuring up to some work quota. These new sex manuals demonstrated that this was not the case. They showed that even sexual activity was a job to be performed. Women have learned what to expect sexually from their partners and a man getting married must worry whether or not he performs up to her expectations. You will realize that when you go through the sex manuals that they are job descriptions. The table of contents read like stages of a "work out" schedule. There are chapter headings like "Doing Proper Exercises to Get Ready," "Eating the Proper Foods," and "Training Yourself So That You Can Produce." Produce what? Produce the proper number of orgasms in the proper

period of time? Even sex has been reduced to a work activity. There's nothing left to the imagination. There's no spontaneity for people who are so oriented to work and produce. The drive carefully explained by Max Weber does not allow people to stop working even when they go to bed.

For better or for worse, within 25 years we won't have to deal with it because the Protestant work ethic is dying a very quick death within the American society. Today most young people are looking for jobs that to a large degree offer them security and a sense of emotional stability. It's rather scary to talk to young people about their future vocations. They come to my office just before graduation and I ask them what they are going to do when they graduate. They do not know. If you have children in college you know of what I speak. So instead of asking what they are going to do, I ask the next question: "What don't you want to do? What don't you want to be?" After they describe what they don't want to be I get this strange feeling that they have described me. Such young people usually say something like this: "I want to work with people in a meaningful way. I want to do something that is aggrandizing of personhood."

I feel like telling them that I'm looking for a job like that myself. The Protestant work ethic is dying but the people who will be retiring over the next few decades still will be highly influenced by its principles. In dealing with those who are presently retiring we are dealing with the last remnants of a society that holds Calvinistic orientations to work. People who retire over the next twenty-five years will face feelings of worthlessness and guilt. There is no easy answer to this. We sociologists find it easier to analyze than to solve problems. My wife always says that sociologists are like Moses. They know how to lead people through the wilderness but never into the promised land.

The second factor that I would like for you to consider is that retirement makes a person very, very aware of his or her movement toward death. This is more so for men than for women. Interestingly enough, women can retire with greater ease than men because they face the crisis of dying much earlier, usually in menopause. Menopause has a psychological effect on them; it is a way of biologically telling them that they have entered the closing stage of life. But men do not have menopause, contrary to much contemporary thinking. Men may have a "mid-life crisis," but I think it is a mistake to compare that to menopause. It is not the same. The male mid-life crisis is not biological;

it is sociological. In short, women go through the process of facing the limitations of their creatureliness at menopause but men do so when they reach retirement. It is then that men receive the message which is similar to the message that women receive at "the change of life," and the concept of dying is something that makes retirement more difficult. Most of us in this culture have tended to handle death by evading it and by not talking about it and that may hinder our ability to cope with it when we must.

I know a young man who learned that talking about dying before death can be a significant help to facing life in the face of death. My friend Mel discovered that he was suffering from cancer of the lymph system and that he had at most six months to live. Mel was a promising writer in his twenties who already had been dispirited by the climate of death in Vietnam, where he had been a soldier. He went to New York in hopes of finding a cure. He found none, and he did not know what to do between then and the time he would die. He heard of a course at Union Theological Seminary for those who are working with the dying. He went to register for the course but it was filled up, so he ended up in a course on the Book of Revelation, as taught by Daniel Berrigan.

The hour for the class arrived and passed. The room was quiet and still. Mel didn't realize it was Berrigan's custom to begin his classes with a brief period of meditative silence— he never arrived on time because he wanted the silence to pervade the class. Mel became terribly nervous. When Daniel Berrigan did come in, his eyes stumbled on Mel, who was by then very pale, very woeful looking, and in the late stages of cancer. Mel became more nervous. He thought that perhaps the class was silent because they were waiting for the uninvited guest to leave. But Mel held his seat. When you are going to die, you can be rather free; you don't have to be polite. At last the silence was broken and Daniel Berrigan spoke directly to Mel with the simplest of questions: "What's the matter?"

Mel briefly considered various responses, including "It's none of your business," but the responses seemed both useless and fruitless. So he said, "I'm dying, I'm dying of cancer."

There wasn't even a pause in Berrigan's response; nor was there a sudden emotion of sorrow or pity in his face. He simply said, *"That must be very exciting."*

The confrontation with death, with the awful power of death made present in a young life, brings shock and horror. The pious promise prayers; others, silence. Most flee. Few can imaging calling it "exciting."

For Mel, this brief, impossible sentence fell like a stroke of lightning, an instant Zen enlightenment, a transfiguration. Yes, he said to himself, how true. It's the most extraordinary event of my life. I never before faced death nor have I ever talked to anybody who has died.

As it happened, Mel was not, in fact, so quick to get into the cemetery. For some reason, the cancer evaporated from his body nearly as fast as water boils and Mel is with us to this day. The awesome message of this story is that it is possible to see positive possibilities in facing death.

There is a rebirth in neo-Freudian psychology among contemporary writers and I think their new perspectives make Freudian thought very useful in modern therapy. I'm thinking specifically of the works of Norman Brown and Ernest Becker. If you have not read their books, I strongly recommend them to you. They will aid in understanding the psychology of retirement. Both of these men have a lot to say about retirement. *Denial of Death* is by Ernest Becker, who won the Pulitzer Prize for his work. Norman Brown's book, *Life Against Death,* is the earlier and the more profound of the two but the harder to read.

In both of these books, the theme is the same. They both agree that Freud was right in saying that civilization is built on repression. They both note that to be civilized is to repress. But they turn from the views expressed in the early writing of Freud which suggested that we are repressing our libido urges; they emphasize the views represented in his later writings, which declare that it is the consciousness of death that is being repressed. Early in his studies, Freud said that what is being repressed is our sexual desires, our sexual energy, and our sexual drive. He suggested that all of us are preoccupied with sex and that we need social devices and social institutions to repress our sexuality. But later Freud went beyond that belief. He saw what was really taking place was not the repressions of sexuality but instead the repression of death. He taught that all our sociopsychological devices are aimed at concealing the reality of death from our consciousness.

What in fact both Becker and Brown suggest in updating Freudian thought is that as people move toward retirement and as they face the end of their professional careers, the mechanisms of repression break down. The techniques that are essential for repressing death collapse and the consciousness of death becomes a sudden preoccupation.

A graphic example of what Becker and Brown suggest occurred while I was teaching a course at the University of Pennsylvania on the

subject of existentialism. It was a seminary class of typical undergraduate students, except for one woman who came to take this course as part of an adult education program. I think she was 62 years old. We got talking about death and the students were speaking very profoundly about how we must have the heroisim of Neitzsche and face death unafraid. Like Neitzsche, they made such statements as "we must build our city at the foot of Vesuvius, we must face death as the great challenge of our being, we must face it as supermen."

After a lengthy discussion the woman, who had been silent the whole course, said, "You don't know what you're talking about. You don't know what you're talking about. I'll tell you what it's like to be my age. It's like going to an organ concert and a note gets stuck on the organ. You don't hear it except when there are pauses in the music. During the pauses in the music you can detect the faint sound of the stuck note. But as the recital progresses the sound of the note gets louder and louder and louder until you hear it, not only during the pauses, but even when the music is being played. Eventually the sound of that note becomes so loud that it drowns out everything and you can no longer enjoy the concert at all. Death is like that note. At first it hardly bothers you but the older you get the less you can ignore it. Eventually it destroys the beauty of everything."

That says it very graphically. We suppress death. We don't even think about dying except at rare rare moments where there are pauses in our lives. That is why Blaise Pascal, the 17th century philosopher said, "All evil stems from this. We do not know how to handle solitude." Solitude is the pause wherein death breaks into the consciousness.

"It is in the later afternoon," says Lord Chesterson, "when the children tire of playing their games that they turn to torturing the cat." It is when the games of life seem to be grinding to a halt and we have time on our hands that we turn to doing terrible things to each other. We do destructive things and torture others, often those whom we love most. Retirement often becomes a time when people begin picking and picking and picking on everyone, to the point that they become unbearable. They seem to torture everybody around them and then nobody wants to associate with them. This is their way of escaping the reality. The nagging of retirees is only an attempt to focus their attention on something other than death.

Soren Kierkegaard said that each of us is like a smooth pebble that is thrown over the surface of a pond. We dance along the surface of the

water until we come to that moment when we run out of momentum, and then we sink to 100,000 fathoms of nothingness. We can dress up retirement all we want, but these are the kinds of psychic notions that are being repressed, and when we face retirement we realize that the devices for repressing such negative realities begin to break down.

How many of us, when our heads hit our pillows at night, have this last thought—I am one day closer. We all must make noise on New Year's Eve in order to drown out the macabre sound of grass growing over our graves. Death affects everyone, and upon retirement it especially hits the male. As I said earlier, the female goes through her ordeal much earlier, but for a man this is often the first time he has had to grapple with it. As people who work with retirees, we must see that it is essential that we help them to grapple with death in a positive manner. We must demonstrate that death can hold tremendous potential for good.

Dostoevski describes in *The Idiot* a man on his way to the guillotine. He tells how that man waits out the day on which he knows he is going to die. This is not just another day; this is the day he knows his life is going to end. Death has come rushing toward him like a speeding locomotive. He eats his last meal, his last on earth, and he does so with an intense appreciation such as he has never had for any other meal. You can understand why. When they take him out into the courtyard he feels the heat of the sun upon his head and shoulders. He feels the warmth of the sun with an appreciation that he has never known before. As he walks through the crowd, which is shouting against him and calling him names, he has a heightened awareness—they all fascinate him. He studies every face and tries to imprint its features in his memory. He views everything with an intensity hitherto unknown. It is in the awareness of death that he comes to know life more richly and more fully than he had ever known before.

Death can either destroy your sense for living and reduce you to a psychic vegetable, or death can present the possibility of steering you to a level of appreciation and joy and excitement about life which can make life incredibly richer. In fact, dying holds potentialities that too few of us recognize for a redemption of life.

Those of us who are in a death environment have to recognize that for many of the people we see, perhaps the answers do not lie in new social and psychological techniques. We have become too therapeutic, and Christopher Lash, in *The Culture of Narcissism,* justifiably strikes out

at our clinical approach to everything. Perhaps what people need as they approach retirement is a philosophy course. Such courses would enable them to study the creative ways that generations of human history have handled death. Maybe we should help retirees to analyze death in depth. Why must we always treat people like Pavlovian dogs that are manipulated with stimulus-response? Do we not believe that people have intelligence? We should recognize that retirees are people about to make a major transition in their lives and they need to understand what is happening so that they can decide how to handle it. Maybe for people facing retirement there should be a whole educational process that trains them to think about life and death in new ways. We need to encourage a new consciousness by raising philosophical issues which deal with ultimate issues about human existence. This might be one of the best ways of preparing people to handle retirement in a creative manner. Why do we think that philosophy courses are for college sophomores? Retirement is the time when people need a philosophy course the most. Yet this is the time when people talk about what philosophers say the least. Existentialism, which deals with life and death and its many profound dimensions, is a course that is generally taken by twenty-year-old collegians. Maybe it is time for retirees to be reading Dostoevski, Sartre, Camus, and Kierkegaard. You might complain that such reading is too heavy for the average retiree. They cannot understand such stuff. Of course they can! And they can do it even better than young people.

My last point has to do with the necessity of having retirees develop creative attitudes toward their futures. In sociology there is a growth of the humanistic approach to personality. Its primary proponent, George Herbert Mead, argued that we must recognize that the future influences who we are more than the past.

Unfortunately, most of the models for understanding personality set forth in American psychology have overaccentuated the influence of the past on character formation. We have come to view people as conditioned creatures. Certainly behavioral models, (i.e., those of B.F. Skinner) leave us with the impression that people are simply conditioned *Homo sapiens* and that is all that they are. Such interpretations reduce human beings to advanced models of Pavlovian dogs. While humanistic models would, in fact, say that the past influences what people are and do, humanists believe that people are responsible creatures capable of molding their own destinies. They argue that what people decide about the future can influence them more than the events of the past.

Let me illustrate this point. All summer long my son was shooting a basketball through a hoop nailed to a pole in front of our home. How can his behavior be understood? Is it because every time he put the ball in the hoop in days gone by he was rewarded? Is he *conditioned* to put the ball through the hoop because he associated such action with a reward? No! His behavior can only be understood by his hopes about the future. In November he will go out for the college team. His behavior in summer is understood in light of his expectations in the fall.

I deal with young people in college, and they come to my office depressed. I have learned through my counselling that the last thing in the world I should talk about is their past. If I can take a depressed 21-year-old kid and make him believe that there are tremendous possibilities for the future, he is immediately delivered from his depression. Those of you who have children or grandchildren know that if you have a child who is depressed, you have somebody who is probably depressed because he or she does not have exciting, well-defined goals. Thus, instead of events from the past, the goals of the future influence the person's present state.

If this approach is valid, then many retirees face depression because they cannot envision positive things about it. Without a positive view of the future, people at any age find it impossible to experience joy. This, incidently, is the difference between those who survived the concentration camps of World War II and those who did not. Studies found no differences—economic, sociological, or psychological—in backgrounds. Those who survived and those who did not seemed to be very similar. However, one quality that only survivors had was that they could believe in a bright future in the midst of disastrous circumstances. Those that could believe in tomorrow and those who had dreams about the future were the ones who could make it. Those who tried to live just one day at a time died. Survivors believed that one day, some day, it would be beautiful and wonderful again.

Can those of us who work with retirees get them to believe positive things about the future? If the future is as important as the phenomenologists and humanists say, such a belief is essential. Some people find the hope for the future in religion, but certain religions do not offer any doctrine of the afterlife. Certain evangelical Christians can talk about heaven and the glories of the afterlife, and such talk provides joy for them, but the problem is not so easy to solve for those who are Orthodox Jews or who do not believe in a glorious future on the other side of the grave.

In what ways, in a culture so oriented to youth, does one create meaningful goals toward which elderly people can aspire? This is a question we must answer.

I guess that the ultimate retiree has to be Abraham in the Hebrew Bible. At the age of 92 he had a calling from God—"Leave the Ur of the Chaldees and go!"

"Go where?" asked Abraham.

"I'm not going to tell you," said God.

He is so much akin to every retiring person I know. He stands to leave the known and move into an unknown.

"You're going to build a city," said God.

"What City? Where? When?" asked Abraham. He turned to his wife and said, "Sarah, I've got a vision." (Can't you hear her saying, "What? What vision?") And then he said, "We're going to create a new world!"

Sarah probably said, "Go back to bed. New world, how could we start a new world? How do you propose this new society be started?"

And Abraham said, "Well, Sarah, I don't want to shake you up, but it starts from you."

This image of people setting out, ignoring the uncertainties, overcoming the fears, and triumphing in hope is one that should encourage all retirees in all ages.

One evening my family and I went to New York to see *The Man of La Mancha.* As I sat with my wife and children watching that famous musical, the woman next to me started to scold her husband.

"Josh, Josh, stop, stop, you're making a fool of yourself," she said.

I leaned forward to find out what was going on. There sat an elderly man dressed in a business suit and crying uncontrollably. I was wondering what had happened to him and suddenly it dawned on me. Don Quixote was singing, "to dream the impossible dream, to fight the unbeatable foe, to strive with the last ounce of courage, to go where the brave dare not go . . . and the world will be better for this, that one man, bruised and covered with scars, still strove with his last ounce of courage to reach the unreachable star."

In the Hebrew Bible, "when the young men no longer dream dreams and the old men lose their vision, people perish." Please understand that retirement must become a time when people still believe that there is time to fulfill visions and to allow dreams to come true. It must be viewed as a time to do incredibly important things. It must be a time to

deal with the ultimate realities which hectic schedules never before allowed. I don't know how to keep the dreams and visions alive, but we have to learn how. We must not only create interesting things for retirees to do, we must not simply create meaningless work to keep them occupied, we must find ways for them to live out visions and dreams. Perhaps, as Maggie Kuhn says, we have to involve elderly people in the political and socioeconomic issues of our times in such a way that they become the activists that will realize the dreams and visions that have gotten lost along the way.

Let me review my major points: there is a work ethic to be considered; there must be a facing of the reality of death; there must be a hope for the future. These are three things that must be dealt with in depth if we are going to treat retiring people as something other than objects. We must relate to retirees and help them to view themselves as sacred "Thous."

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The Johnson Foundation for Medical Physics
The First Department of Medical Physics and Biophysics

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SUMMARY: Eldridge Reeves Johnson, a pioneer in the gramophone industry, and Alfred Stengel, Professor of Medicine at the University of Pennsylvania, joined their powers and talents to found the first department of medical physics. Under its first director, Detlev Bronk, the Johnson Foundation began a long (and continuing) history of important and innovative research.

THE Johnson Foundation for Medical Physics was officially born in March of 1929, when the board of directors of the medical school of the University of Pennsylvania resolved that Detlev Wulf Bronk be the first director of the foundation and the first Eldridge Reeves Johnson Professor of Biophysics.[1,2] This foundation was the first organized department founded with the specific goal of applying the forces of physics to biological and medical problems. At the dedication ceremonies, Alfred Stengel, the professor of medicine at the university, announced that the foundation would have laboratories studying biophysical problems in the following disciplines of physics: a) studies in light and optics relating to sunlight, mercury and quartz lamp rays, infrared rays, radium emanation, X-rays, and related topics; b) the study of heat, including the biological aspects of heat and the practical problems of heat as it relates to disease and its treatment; c) studies in sound and audition, including investigation of hearing and the application of instrumental methods for improving hearing (this laboratory would also conduct studies in the reproduction of sounds—heart sounds and the like—and in the physical effects of sounds); d) physical measurements of movements in the human body such as heart action, movements of the stomach and intestine, the flow of blood, and the intake and output of air; e) photographic and cinematographic study of body processes and conditions; and f) the study of electricity and its relation to the

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diagnosis and treatment of disease (including the study of the value and limitations of the various types of electrical currents already in use in medicine).

As so often happens with pioneering ventures, the organization of this important foundation did not result from careful planning but from the chance interaction of three interesting personalities in the first quarter of the twentieth century: Alfred Stengel, professor of medicine at the University of Pennsylvania; Eldridge Reeves Johnson, founder of The Victor Talking Machine Company; and Detlev Wulf Bronk, the first director of the Johnson Foundation.

Alfred Stengel

Alfred Stengel, William Pepper's son-in-law, was chairman of the department of medicine in the 1920s before he became vice-president in charge of medical affairs at the University of Pennsylvania.[4] Previously he had been director of the William Pepper Laboratory and had been appointed professor of medicine when David Edsall resigned.[5,6] Stengel was a small, energetic, but distant man who was a good clinician, clinical administrator, and department chairman. Furthermore, he had an amazing ability of talking his patients into giving money to the University Hospital and Medical School.

Stengel convinced Martin Maloney, a patient of his in the 1920s, to give $200,000 to initiate a drive to build a new wing for the hospital—the Martin Maloney Clinic.[7] Stengel's idea was to develop a modern medical clinic that combined the medical specialties, the clinical laboratories, and the associated clinical research divisions. Together they could better interact, yield the most up-to-date care for patients, and at the same time advance medical knowledge. So that all work and no play would not make the Stengel resident and medical staff officer a dull boy, he even planned that a squash court be placed on the roof of the clinic building (pers. comm., Dr. Edward Rose).[2]

While Stengel was arranging this project, Eldridge Reeves Johnson became his patient. The patient-doctor association between the two was to have a profound influence on medical research in the next fifty years, for this was the essential step that led to the organization of the Johnson Foundation for Medical Physics.[3]

Eldridge Reeves Johnson and The Victor Talking Machine Company.

Eldridge Johnson joined the Skull Machine Shop in 1891 as head machinist. Andrew Skull liked Johnson, and shortly thereafter he became a partner in the business; the firm's name was changed to Skull and Johnson, Manufacturers and Machinists.[8,9] Skull's son, John, who had died suddenly in 1888, had invented an automatic wire book-stitching machine, but it had not been developed to the extent that it could be marketed. Johnson now redesigned this machine and made significant improvements over the one originally invented by the younger Skull. At first, Skull and Johnson could not sell the book-stitcher, and since the income of their company was insufficient to support two owners, they decided to dissolve the partnership. In 1894 Eldridge Johnson purchased his partner's interest in the firm and changed its name to Eldridge Reeves Johnson Co., Manufacturer and Machinist. This was the beginning of the firm that eventually became the Victor Talking Machine Co. Later, sales of this new book-stitcher increased and the New Jersey Stitching Machine Co., which Johnson incorporated to manufacture and sell his machine, paid a dividend continuously until 1945.[9]

Small machine shops such as Johnson's played an important role in industry in the late nineteenth and early twentieth centuries—they repaired machines, manufactured replacement parts, and made early models of new inventions. These small shops were the haunts of the independent inventor, for here the work of development and construction of the early experimental models was carried forward. In this work Johnson's creative talents found a natural outlet, and these agreeable activities brightened the hard financial struggle to keep his business alive.

In those lean years while searching for business, Johnson wandered into another of these small machine shops. The proprietor set before him a queer device which made a sound like a "raucous parrot."

"Here is something that might interest you," the machine shop manager told Johnson. "It is a fifty cent job, but you can have it if you think it is worth monkeying with."

While repairing a broken screw in the curious toy invented by Emile Berliner, young Johnson, as he later said, "dreamed a dream." He realized immediately the potentialities of Berliner's Gramophone, and seizing on this opportunity, Johnson improved what he called "Berliner's

toy."[8,9] He built a spring motor that evenly and reliably spun the disc turntable, and he improved the sound system and the recording techniques. Despite some intricate legal battles over the newly emerging industry (one of which prompted the victorious Johnson to change the name of his business to The Victor Talking Machine Company) and delicate negotiations over patent rights, Johnson was associated with Emile Berliner in various capacities from the mid-1890s until his death in 1929, shortly after Victor merged with Radio Corporation of America.[10,11]* Johnson's talking machine captured the world. The company became an international corporation and Eldridge Reeves Johnson became a multimillionaire.

In the mid-1920s Mr. Johnson's personal physician requested he see Dr. Alfred Stengel concerning a medical problem. Stengel admitted Mr. Johnson to his service at the Hospital of the University of Pennsylvania for tests and treatment, and thus began the friendship between Eldridge Johnson, Alfred Stengel, the University Hospital, and the Medical School.

Birth of the Johnson Foundation

Eldridge Johnson was very much impressed with Stengel as well as with Stengel's management of his medical problems. When Mr. Johnson indicated his wish to make a bequest in appreciation of the services of Dr. Stengel and the University Hospital, Stengel pointed out to him that although there were many departments in which chemistry was applied to medical science, there were no departments in which physics was so applied. As chairman of the department of medicine, he had contact with the department of physiology and its professor, H. Cuthbert Bazett, at various faculty meetings and functions. Doubtless Bazett at

* The company trademark—the terrier listening to the horn of the talking machine and the legend, "His master's voice"—was purchased from the British Gramophone Company, which introduced this as a trademark for its product. Its originator was an English painter, Francis Barraud, who inherited a fox terrier named "Nipper." They became fast friends, and one day in 1899 it occurred to the artist, an early addict of the talking machine, to depict "Nipper" in his favorite posture in front of the machine's horn ("Nipper" enjoyed the sounds emanating from the horn as much as did any human being). The painting became the property and trademark of the British Gramophone Company, and it was so successful that it eventually was used by gramophone companies all over the world. At some later date Johnson obtained the rights to use "Nipper" as the trademark for his Victor Talking Machine.

some time had planted the seed in Stengel's mind that a modern clinic, such as he wished to establish, should have a division of medical physics to study the application of physical techniques to medical problems. He persuaded Eldridge Johnson that the idea was sound.

An insight into Stengel's ideas regarding the establishment and organization of a department of medical physics is given in a letter to O. H. Perry Pepper, chairman of the department of medicine:

> The Johnson Foundation was established after considerable correspondence between Mr. Johnson and myself, in which I indicated to him that the department of medical physics as an integral part of a modern medical clinic would be a desirable step in the direction of institutional progress.
>
> In the beginning, I had considerably more modest views of the extent of his possible endowment, but fortunately he agreed to give $600,000 for endowment and $200,000 to add an additional floor to the projected Maloney Clinic Building.... In view of this expansion, it was found necessary to look for a head of it [the department] who would rate a professorial rank, and Dr. Bronk was therefore made professor of biophysics.[2]

This choice of Bronk as the first director was another important step in the origin of the Johnson Foundation, for he not only had the proper training but also the right personality and administrative ability for this task.

Detlev Wulf Bronk

Detlev Bronk entered Swarthmore College after graduating from Troy (New York) High School in 1915. When the First World War started, Bronk enlisted in the Naval Air Corps, against his father's wishes. In 1918 he earned his wings and was commissioned ensign; the war ended shortly thereafter. Before entering the service, Bronk had met and courted Helen Alexander Ramsey. They were engaged in 1918, and after the war both returned to Swarthmore; they graduated in June of 1920 and were married in 1921.

After receiving his degree in engineering, Bronk taught physics at the University of Pennsylvania for one year and then decided to obtain further training in physics at the University of Michigan. While at Michigan he developed an interest in studying the physics of living organisms. To broaden his background for such studies of biological problems, he decided to obtain a degree in physiology. Harrison

McAllister Randall, of the physiology department at Michigan, encouraged Bronk in this goal by emphasizing that biophysics was an unexplored field and that he would like to have person trained in both disciplines in his department.

At Michigan Bronk worked in the physics department on infrared spectroscopy and in the physiology department on the regulation of respiration. The latter work was done with Robert Gesell, with whom he published several papers between 1925 and 1928.[1,2] When Professor Bazzonni at the University of Pennsylvania learned of Bronk's interest in physiology and physics, he informed him that Bazett, in the physiology department at the school of medicine, was looking for someone who had a background in both fields to help him with his studies on temperature control by the central nervous system. As early as 1925 Bronk was interested in the study of nerve impulses, "their generation, conduction, transmission across the synapse and their manner of activation." He further stated at this time, "I have finally developed what I believe to be entirely new methods for measuring conductivity, for determining pH, and for amplifying [these nerve impulses] with vacuum tubes without drift or distortion."[3]

After receiving his graduate degree in physiology and physics, Bronk returned to Philadelphia and accepted a teaching position at Swarthmore College as assistant professor of physiology and biophysics. He also obtained a laboratory position in the physiology department at the University of Pennsylvania Medical School, with part-time responsibilities for directing graduate-student research.

After a few years in these positions, Bronk found that he was not penetrating the frontiers of science to the degree he had hoped. Discouraged with his lack of progress, he now considered a fellowship at Cambridge, England. He wrote E. D. Adrian, whose work on nervous action was well known. Adrian, having heard of Bronk's capabilities, suggested that he come to England and work both with him at Cambridge on nerve conduction and with A. V. Hill on muscle physiology in London.

In 1928, Adrian had been able to amplify and record signals from individual sensory nerve fibers in skin and subcutaneous tissues. He was unable to record from motor fibers, since during motor activity a large number of fibers fired simultaneously. Bronk made an important contribution to the understanding of how motor nerve cells innervate

muscle fibers when he developed an electrode (the Bronk electrode) consisting of a small needle containing an insulated wire connected to an amplifier. With this microelectrode he could record the action potential of muscle cells in the vicinity of the needle's sharp tip. This action potential reflected the activity of a single motor nerve cell, because one motor axon innervates a large number of muscle fibers. Since the nerve fibers did not have to be cut, this was an ideal electrode for measuring motor activity in human nerve fibers. This later became the electromyograph.

Bronk and Adrian published four classic papers in 1928 on the discharge of nerve impulses.[3] After 10 months at Cambridge Bronk went to London to study with A. V. Hill how heat is generated during muscle activity. This work, using the sensitive Dowling galvonometer to measure heat formation, resulted in the publication of three papers with Hill.[3] His study of biophysics in England gave Bronk the background he required to develop instruments that measured physical parameters of biological systems. This knowledge was largely responsible for the immediate success of the newly formed Johnson Foundation.

Bronk now began to dream of still broader activities. Before he left Philadelphia, Bazett had discussed with him the possibility of establishing an institute for medical physics at the University of Pennsylvania. While in Europe, he continued correspondence with Bazett concerning this prospect.

When Bronk returned to Pennsylvania from England, he was rewarded with the support of Bazett and Stengel to become the first director of the proposed new foundation and the first Eldridge Reeves Johnson Professor of Biophysics.

Relationship Between The Johnson Foundation and the Department of Medicine

The relationship that developed between Stengel, Bronk, and the Johnson Foundation and the foundation's relationship to the department of medicine are described in a letter from Stengel to Perry Pepper, Stengel's successor as chairman of the department of medicine:

> Though the relation of the Johnson Foundation was always substantially the same as the relation of the Pepper Laboratory or any other subdivision, I [Stengel] did not regard the Foundation as in a direct sense under my control as Professor of Medicine, though in my other capacity [later] as Vice President, I

> continued to have certain authority which never required exercise. In view of the association of Dr. Bronk with our projected Neurological Department, I would regard the Johnson Foundation as having moved a little further away from the division of medicine in the sense of control.[2]

Organization of The Johnson Foundation—Early Days

Bronk accepted the position as director of the Johnson Foundation in April, 1929. He now began to gather a group of remarkably talented scientists, specialists in different but closely related fields of biophysics, whom he felt would interact to build a foundation for advanced studies of disease and biophysical research. His progress toward this goal is indicated in a letter written to Doctor Stengel in October, in which he states, "the laboratories are finished, a staff has been appointed and Ragnar Granit from Stockholm and W. A. H. Rushton from Cambridge would be soon arriving to spend a year or more in research in the Johnson Foundation."[2]

A year later John Donal, Frederic Gibbs, Harry Grundfest, and H. K. Hartline were added to the staff. Most of these early investigators remained for a few years and after finishing a project left for permanent positions elsewhere. Hartline came to the Foundation in April, 1931, and remained with Bronk for forty years, moving with him from Pennsylvania to Cornell, back to Pennsylvania, then to Johns Hopkins, and finally to the Rockefeller Institute (which Bronk changed to Rockefeller University). Bronk realized that the Johnson Foundation provided an excellent opportunity to develop the discipline of medical physics and he devoted all of his time to research and to the training of graduate students. Bronk had the unusual capacity for holding jobs in different institutions while still carrying out his duties in his home department. From 1932 to 1934 he remained the director of the department of physiology and zoology at Swarthmore College, and in 1934 he was off to England to work again with Adrian.

His work at Michigan with Gesell had given Bronk a preliminary knowledge of cardiovascular physiology as well as some insight of aspects of the neural control of muscles and glands. His year with Adrian allowed him to work directly with neurophysiology basic to understanding gradations of neural activity and the frequency of impulses. With this knowledge of the neural code and his new technique for recording neural impulses from single fibers, Bronk and his colleagues

over the next ten years provided the basis for our present understanding of the regulation of blood pressure.

In the period between his first paper, published with G. Stella in 1932,[13] and the last he published, with R. F. Pitts and M. G. Larrabee in 1941,[14] Bronk investigated the receptors for detecting changes in blood pressure, the central control centers, and the properties of the efferent neuronal systems controlling heart rate and diameter of blood vessels—two important factors in determining blood pressure. With Pumphery and Hervey, Bronk spent several years studying the problem of mediation of synaptic transmission. They discovered the important property of trans-synaptic excitation and the prolonged effect of previous activity.[15] Ragnar Granit, later a Nobel laureate who shared the prize with Hartline, thought this was one of the most significant contributions of the work of the Johnson Foundation.[3]

For reasons that were then unclear, Bronk accepted a position as professor of physiology at Cornell University College of Medicine, an appointment formalized in February, 1940, by President Edmund E. Day. Bronk was also considering at the same time a proposal to develop a department of biophysics at M.I.T., and during the same year he also was considering an appointment as head of physiology at the University of Chicago Medical School.

Detlev Bronk made his move to Cornell in 1940, amidst many discussions between A. N. Richards, Thomas S. Gates (president of the University of Pennsylvania), and Edmund E. Day. H. Keffer Hartline, Martin G. Larrabee, Frank Brink, Philip W. Davies, Arnold J. Rawson, John P. Hervey, and Glenn A. Milligan all made the move to New York with him.

This excursion to New York by Bronk and his group was terminated in March, 1941, when they all returned to their old positions at Pennsylvania and the Johnson Foundation. Apparently Bronk returned because he felt that the exclusively medical environment at Cornell did not provide the best environment for biophysics as an independent discipline and intellectual enterprise. Bronk felt that in a medical school biophysicists were regarded by the medical faculty as mere technical specialists who were supposed to build instruments for research, to instruct the faculty in how to use these instruments, and to repair the equipment when it broke down. This Bronk would not do.

In 1937 the Neurological Institute (now the Institute for Neurological Sciences) was created at Pennsylvania to provide close professional relationships between those in biophysics and those in neurological research. When Bronk went to Cornell, the future of this project was uncertain. Before he returned, Perry Pepper wrote Bronk and turned over to him some of the problems of organization of the Institute.[2,3] The Neurological Institute, with its original purpose intact, is in existence today—more evidence of Bronk's insight into the organization of medical research.

Later it became apparent that the cause for the move to Cornell was that funding for all the members of the Johnson Foundation was becoming uncertain. Upon Bronk's return to Philadelphia in 1942, the budget sheet looked much brighter, since in the intervening time money had been obtained through Richards for study of military problems, especially the high-altitude physiology and nocturnal visual acuity of pilots. Richards knew that Bronk was an aviator and felt that the facilities of the Johnson Foundation and the altitude chambers planned to be built in the medical laboratories would facilitate the initiation of the studies required by the war effort. Richards could make these arrangements, for he was now head of the Committee on Medical Research and was in charge of directing the national medical research effort within OSRD (Office of Scientific Research and Development), created by Vannever Bush. During the war, the developments of John Lilly, Glenn A. Millikan, Philip W. Davies, Frank Brink, and Arnold J. Rawson were applied to high-altitude physiology. The war effort at the University of Pennsylvania was a collaborative one between the Johnson Foundation and the departments of medicine, physiology, and pharmacology. Oxygenation of blood at high altitudes was a main problem of these investigations, and some of the hemoglobin saturation curves still in use today resulted from this work.[16]

When the war ended, Bronk again looked for broader fields, and in 1948 he accepted the offer of the presidency of Johns Hopkins University. Once again, many of the talented investigators he had assembled in Philadelphia moved, this time south to Baltimore.

What Detlev Bronk accomplished in the twenty years between 1929 and 1949 with the Johnson Foundation is astounding. The earliest members won the Nobel prize, they originated and developed methods for recording potentials from single nerve cells and muscles, they

created techniques for continuously measuring oxygen tension and introduced the oxygen electrode into clinical medicine, and they devised ways to continuously record blood pressure and respiration. In addition, members of the Johnson Foundation carried out pioneer studies in electron microscopy and looked at the influence of radioactivity on growth. Bronk certainly proved that Alfred Stengel was correct to think that progress could be made in medical science by applying the forces of physics to the study of medicine.

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Studies Related to the Pathogenesis of Rheumatic Fever

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SUMMARY: Observations on acute and recurrent attacks of rheumatic fever in children of third world countries suggest that the sometimes capricious behavior of the disease can be accounted for by the theory of molecular mimicry. According to this concept, following pharyngeal infection by Group A streptococci, an abnormal sustained immune response occurs in susceptible subjects that produces painful and disabling lesions in heart muscle and valves, connective tissue structures, and neural tissues.

ACUTE rheumatic fever represents a fascinating experiment of nature which, unfortunately, often proceeds in the afflicted subject's life to subsequent chronic rheumatic heart disease marked by mitral stenosis, regurgitation, or other valvular disorders and to long-term disability. Of all of the so-called connective tissue diseases (rheumatoid arthritis, systemic lupus erythematosus, systemic sclerosis, dermatomyositis, and polyarteritis nodosa), only rheumatic fever and consequent rheumatic heart disease have an initiating cause or etiology that is clearly known—namely, the β-hemolytic Group A streptococcus and initial Group A streptococcal throat infection. We know that streptococci can initiate the disease, but despite intensive ongoing basic and clinical observations in many laboratories all over the world, we still do not have a complete understanding of what features of Group A streptococcal pharyngeal infection are responsible for the impressive acute florid picture of high fever, toxicity, evanescent arthritis, pancarditis, and associated congestive heart failure that may accompany the clinical presentation of acute rheumatic carditis in the affected child or young adult.

Clinical and epidemiological observations by a number of workers have identified the initial streptococcal pharyngeal infection and subsequent latent period of two to three weeks as being apparently essential for incubation, modulation, or final expression of the actual clinical episode of rheumatic fever.[1–4] Moreover, in an important

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fraction of affected children, the only primary feature of the clinical presentation can be seen as Sydenham's chorea or St. Vitus' dance. The proportion of children showing chorea as the only manifestation of rheumatic activity varies and depends on where the child lives. In the rheumatic subjects whom we have studied in Egypt, it would appear that acute or recurrent episodes of chorea may be the only or initial manifestation of rheumatic fever in as many as a third of patients, whereas among other (perhaps less homogenous) patient population groups, chorea is seen in only 5 to 10 percent of cases.

A general impression which my colleagues and I have formed over the past eight or nine years of clinical observation is that the clinical manifestations—be they Sydenham's chorea, arthritis, evanescent skin rash, or pancarditis with congestive heart failure—remain remarkably uniform within individual patients. Thus, the clinical picture of the initial attack—either chorea, arthritis, or rapid progression to carditis—is very faithfully reproduced in every subsequent attack experienced by a given individual. This particular point has proven extremely useful to us in the evaluation of individual patients suspected of having recurrent attacks of rheumatic activity. However, precisely what determines the actual clinical pattern of rheumatic attacks within individual patients is still not clear.

There are several other aspects of rheumatic fever that are puzzling and hard to explain. One is that even before the widespread availability and use of antibiotics, the prevalence of the disorder—at least as classic acute rheumatic fever—had begun to decline. This decrease in reported prevalence has continued during the last several decades and has been observed concurrently in the United States, Canada, Europe, and other temperate areas. Nevertheless, acute rheumatic fever still represents a severe health problem in underdeveloped or so-called third world regions such as India, Southeast Asia, Iran, Egypt and other parts of the Middle East, Caribbean countries, Mexico, and portions of South and Central America.[5–8] In fact, it is in places like Egypt, Trinidad, or India that we currently find patients suitable for study.

The exact reason for an apparent decline in the incidence of observed cases of initial flagrant acute rheumatic fever has really not been very well defined. Part of the decline outside of third world countries has been ascribed to better general standards of living, more widespread use of antibiotics in infancy and childhood, and less crowded living conditions. Another possibility is that there has actually been a

change in the streptococcus itself that has led to the loss of rheumatogenicity or rheumatic fever-producing potential. At present there is, however, very little epidemiological or bacteriological proof to substantiate such a possibility.

Another general problem of attempts to understand the mechanisms critical in determining which individuals develop acute rheumatic fever relates to selective aspects operating on the population at large. A number of careful epidemiologic and survey studies in many different parts of the world have repeatedly shown that if one samples a presumed population at risk—namely, grade school children from ages five to twelve—repeatedly on a monthly or other regular basis, throat cultures will show a carrier rate of 5 to 10 percent for β-hemolytic Group A streptococci.[9–11] Actually, this rate depends on the season of the year; the incidence of isolates of Group A streptococci goes up significantly during the cooler or winter months in most of these studies. Contrasted with these data, the actual cases of serious post-streptococcal sequelae such as acute rheumatic fever or post-streptococcal glomerulonephritis probably represent less than one percent of all subjects showing cultures positive for Group A streptococci in their pharynx. Factors which influence this selection are still not well defined. In fact, no clear or definitive proof that there are truly rheumatogenic or rheumatic fever-producing organisms or strains has yet been made. An important factor may well be the DR or Ia-like phenotype in the host that controls various genetically determined features of each individual's immune response repertoire. The original observations of Patarroyo, et al., concerning the apparently high correlation between the DR-like antigen 883 expressed on B cells and the occurrence of rheumatic fever or rheumatic heart disease[12] may be a central factor that determines which individuals will actually come down with acute rheumatic fever and subsequent chronic rheumatic heart disease. This area represents a clear focal point for our group and deserves intense examination.

One of the most attractive hypothetical models to explain what actually happens during the sequence of events eventually leading to acute rheumatic fever can be called the concept of molecular mimicry. This idea, simply put, means that acute rheumatic fever and, probably, chronic rheumatic activity result from the large number of antigens or antigenic conformations shared between human tissues and materials derived from or present in Group A streptococci. A partial catalogue of such shared antigens is shown in Table 1.[13–19] It can be seen that

TABLE 1

EXAMPLES OF MOLECULAR MIMICRY IN ACUTE RHEUMATIC FEVER

Group A Streptococcal Membranes	and	Human Myocardial Sarcolemmal Membranes[13, 14]
Group A Cell Walls	and	Human Myocardial Cells[15]
Group A Streptococcal Glycoproteins	and	Human Heart Valve Glycoproteins[16]
Group A Streptococcal Antigens	and	Human Brain Antigens[17]
Group A Streptococcal Membranes	and	Human Caudate and Subthalamic Nuclei Neurons[18]
Group A Streptococcal Antigens	and	Human Cardiac Conducting System[19]

components of Group A streptococci cross-react with human myocardial sarcolemmal membrane, human heart muscle, valvular glycoproteins, human brain and central nervous system tissue, cytoplasmic components present within caudate and subthalamic nucleus neurons, and even human cardiac conduction system tissues.

The basic theme in the molecular mimicry hypothesis is that a human host afflicted with Group A streptococcal pharyngeal infection mounts an immune response to various antigenic components of the streptococcus. This immune reactivity is generated within both the humoral and cell-mediated compartments and thus results in humoral antibody production as well as activation of sensitized T cells capable of cell-mediated immune reactivity. This same anti-streptococcal immune response, however, eventually goes astray, since these same reactions may produce self-reactive, harmful phenomena such as acute pancarditis, Sydenham's chorea, or any of the other characteristic events associated with the presentation of acute rheumatic fever.

The same concept of molecular mimicry could also be invoked to explain why certain unfortunate children and young adults sustain repeated and often severe Group A streptococcal throat infections.[20] Extensive sharing of antigens with streptococci might make some patients partially tolerant to antigens shared between themselves and these same bacteria within the oropharynx. This conceivably could

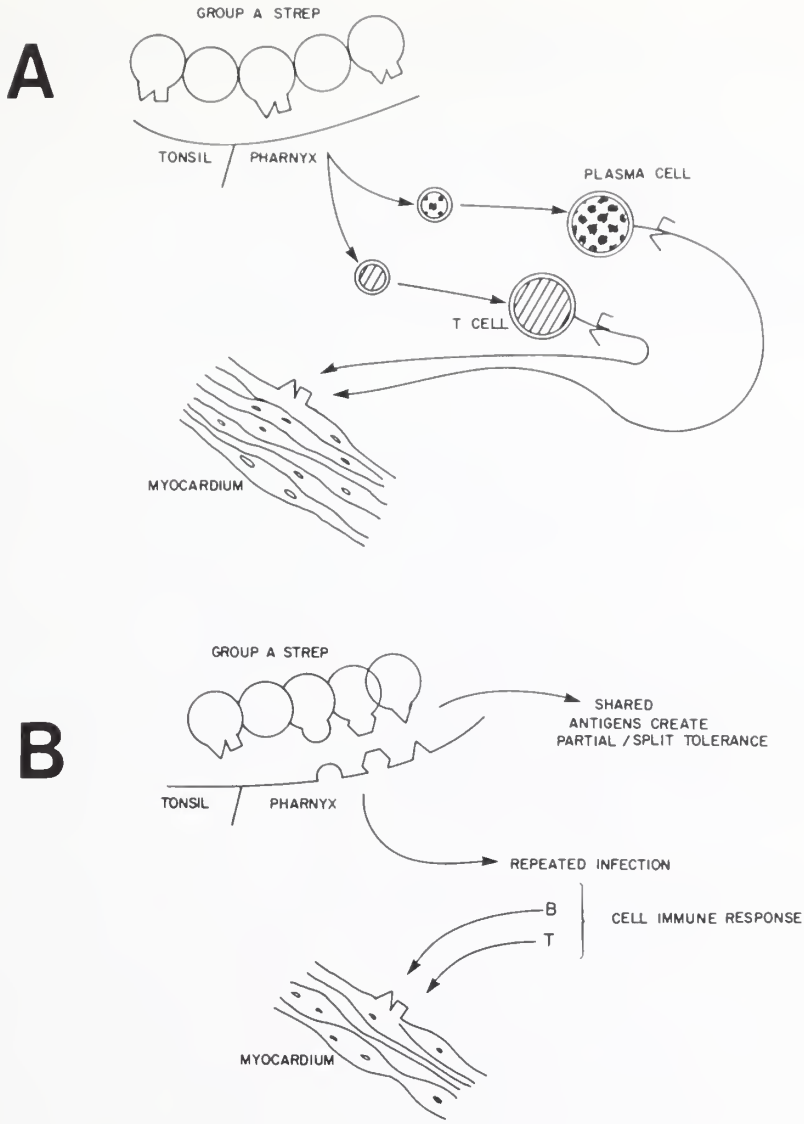

Figure 1. Two possible ways in which molecular mimicry could produce or influence human autoimmune reactions in a disease such as rheumatic fever. A) a simplified model for direct cross-reaction between streptococcal bacterial antigen and myocardial sarcolemmal membrane; B) shared or cross-reacting antigens between the streptococcus and host may provide partial tolerance and thereby too-ready infection or acceptance by the host leading to repeated antigenic exposures such as those shown in A. (From Ralph C. Williams, Jr., 1983. *Am. J. Med.* 75: 727–30, by permission.)

leave susceptible individuals particularly vulnerable to repeated streptococcal colonization and infections which could induce repeated rheumatic attacks.

The two ways in which molecular mimicry might operate in the induction of acute rheumatic fever are illustrated in Figure 1. It has also been recently suggested that a complete picture of the exact extent of molecular mimicry between human tissues and the Group A streptococcus might be greatly accelerated by using computer-assisted analysis of genes coding for clearly defined structural products.[20]

Contributions by Our Group to the Rheumatic Fever Puzzle

Much of our early work focussed on attempts to gain insight into the kind of immune response which might characterize acute rheumatic fever. To do this, we examined phenotypic markers of peripheral blood lymphocytes during various phases of the acute clinical process. Many of these studies were done on patients at the Free Rheumatic Centre in Cairo and those in Trinidad and New Delhi.[21-23] Examination of peripheral blood mononuclear cell profiles showed an early elevation of proportions and absolute numbers of cells bearing surface membrane immunoglobulin or presumed B cells in conjunction with both early and later subacute decreases in total numbers and proportions of T cells (as defined by E-rosetting or other T-cell markers).[24] It was also clear from observations made during a number of our early studies that proportions and numbers of putative antigen binding cells (ABC) were markedly increased during the acute rheumatic process, as measured by adherence of sonicated preparations of purified Group A streptococcal membranes added *in vitro* to isolated peripheral blood lymphocytes.[22] As a matter of fact, the numbers of what might be considered antigen-binding cells greatly exceeded those estimated from previous or concurrent animal models of the immune response. This may be so because the streptococcal membranes utilized in our studies were not a single antigen, but rather showed multiple intrinsic glycoprotein components when subjected to various separating and dissociative SDS gel techniques.

For many years since the early serologic and microbiological studies of acute rheumatic fever, it has been recognized that C-reactive protein (CRP; generally considered an intrinsic marker for tissue destruction or inflammation) is frequently strikingly elevated during episodes of rheumatic activity. When we studied a large group of Egyptian children

with various stages of acute rheumatic fever, marked elevations of lymphocytes that directly bound CRP were present in peripheral blood samples taken during rheumatic attacks.[24] The lymphocytes binding CRP had actually picked it up *in vivo* during the acute process, and actual proportions of cells bearing CRP did not in all instances correlate with concurrent levels of CRP measured in serum or plasma.

It was not clear at first why peripheral blood lymphocytes with CRP bound to their membranes should be increased during acute rheumatic fever. Appropriate studies on separated or double-labeled cells indicated that CRP binding occurred both to T cells and to B cells and did not show any particular preference for either major subgroup.[24] Parallel studies by other groups on possible roles for CRP in body economy had indicated that this material was often capable of modulating or dampening hyper-acute phenomena within the body—for instance, in the interactions with the human complement system or with platelet function.[25–28] We therefore reasoned that in acute rheumatic fever, CRP on the actual effectors—namely, the lymphocytes—of various immunologic reactions might also be playing an important modulatory or regulatory function. When we examined peripheral blood antigen-binding cells and CRP-binding cells simultaneously in peripheral blood samples from children with acute rheumatic fever both in Egypt and in Trinidad, it became clear that the presence of CRP on B cells provided a relative blocking effect for adherence of sonicated group A cell membranes.[29–31] It therefore seems possible that with the elevation of plasma CRP during the acute rheumatic episode, potential ABC lymphocytes already binding CRP are prevented from binding subsequently encountered, potentially harmful streptococcal antigens; this thus down-modulates the acute rheumatic process. The ability of lymphocytes to bind CRP can therefore be regarded as a self-protective mechanism by which the affected individual can suppress potentially harmful immune mechanisms. It might make sense in the future, when we have the technology available (possibly through recombinant DNA techniques), to manufacture human CRP in sufficient quantities to administer it as a therapeutic modality to patients with acute rheumatic fever!

One of the most intriguing mysteries about rheumatic fever and the streptococcus is why certain strains stick in the pharynx and induce pharyngitis and subsequent rheumatic attacks. In a series of studies conducted over many years in collaboration with Dr. William Reed and others, we examined the simple phenomenon of adherence between

various strains of Group A streptococci (isolated from actual cases of acute rheumatic fever) and pharyngeal cells (obtained by simple mechanical scraping of tonsils and pharynx of normal control subjects or patients with rheumatic heart disease).[32,33] These studies showed that there did appear to be greater adherence between bacterial strains isolated from rheumatic children and pharyngeal cells from rheumatic subjects than between other control Group A streptococci and pharyngeal cells from normal subjects. This particular phenomenon is still under investigation in our laboratory. It may well relate to specific surface adherence characteristics or sticking phenomena of either pharyngeal cells or certain Group A strains which are fundamental to generating a long-term infection and subsequent rheumatic fever.

Because we saw such a high proportion of children with Sydenham's chorea during the studies in Egypt, Drs. Husby, Zabriskie, and myself, with others, postulated the hypothesis that the chorea episodes indicate a parallel anti-streptococcal antibody activity. This indeed turned out to be the case—more than half of the children with acute chorea showed an antibody in their serum which reacted with cytoplasmal antigens present within neurons of normal human caudate nucleus or subthalamic nuclei.[18] Moreover, this antibody could be completely absorbed by the addition of purified membrane antigens from Group A, but not Group D, streptococci. Titers of the antibody appeared to correlate with fluctuations of choreiform activity, and the serum antibody often disappeared rapidly with resolution of the chorea. These observations appeared to be consistent with the idea that the host's antibodies with primary reactivity against Group A membrane determinants cross-reacted with cytoplasmic antigens present in human caudate and subthalamic neuronal nuclei and that this cross-reactivity might somehow play a central role in initiating Sydenham's chorea.

There are still many unanswered areas to this aspect of molecular mimicry. One of the most difficult to unravel is how anti-neuronal antibody might initiate chorea. It is difficult to postulate direct access of the plasma antibody to brain cells, since ordinarily the blood-brain barrier would intercept such transmission. However, as we have previously indicated, conglomeration of immune complexes known to circulate in high levels in acute rheumatic fever[34,35] directly within the choroid plexus might alter the blood-brain interchange sufficiently to permit access of antibody directly to brain cells.

Most recently, in collaboration with Dr. Veena Raizada, Dr. John Zabriskie, and many colleagues in several large cardiac centers in India, we have examined fresh cardiac valvular tissues for the types of immunologically oriented cells present within the rheumatic patient.[36] These studies were prompted by the observations of our Indian colleagues that some 25 percent of valvular tissues from mitral or aortic surgical materials examined histologically showed impressive degrees of mononuclear cell and lymphocytic infiltration. What we found upon examination of these tissues with the newly developed T cell subset specific antibodies was that most of the lymphocytes were T cells. In addition, within the interstitial collections of OKT3(+) T cells present within the valvular tissues, the majority were OKT4(+) T cells, presumably of helper or inducer phenotype. In many instances these collections of helper T cells were noted in close apposition to fibroblasts laying down collagen. It therefore seemed possible that one feature of the disease process in heart valves included collections of interstitial helper T cells that possibly secreted lymphokines and produced a message for fibroblasts to lay down collagen and scar tissue; this may eventually produce the deformities so characteristic of mitral stenosis or regurgitation.

During the course of these same studies, we used sensitive indirect immunofluorescence techniques to examine a number of tissues for the possible presence of retained or residual streptococcal antigens.[36] In this work we found no evidence for residual local retention of streptococcal antigen within cardiac atrial appendage or mitral valvular tissues. Thus, if cross-reactive streptococcal antigen is involved locally in the induction of heart damage, not the original streptococcal antigen epitopes but, perhaps, only the antigenic messages are retained.

A number of new avenues of study are available at the present time. Perhaps the most exciting area is the new opportunity to examine possible immune response, gene-related aspects of the disease itself. The original observations of Patarroyo, et al.,[12] on the high prevalence and apparent association of the 883 B-cell alloantigen with rheumatic fever and chronic rheumatic heart disease were of particular seminal interest. In collaboration with Dr. John Zabriskie and our colleagues in India, we have recently increased our observations on the positive relationship between 883 and rheumatic heart disease by using newly

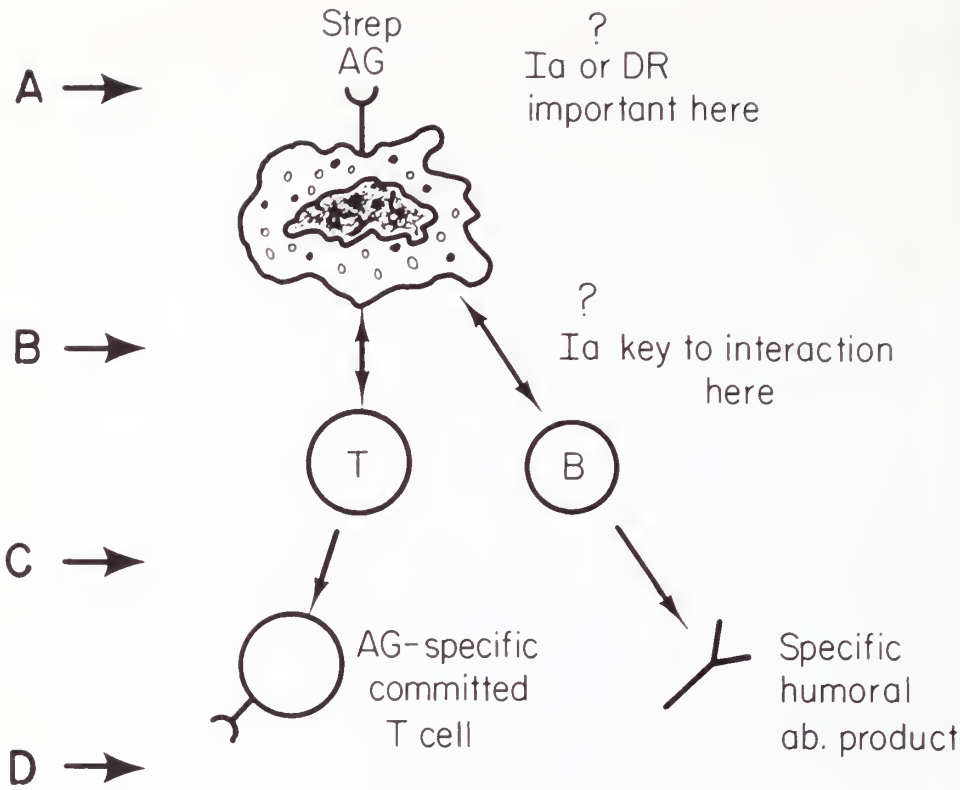

Figure 2. Key features of hypothetical immune response to streptococcal antigen (Strep AG). A macrophage with membrane receptors for streptococcal antigen epitopes passes on a specific antigenic message to both T cells and B cells. These then differentiate to make either antigen-committed T cells or specific humoral antibodies. The steps A, B, C, or D indicate where Ia or DR-like cell surface molecules may influence the course or magnitude of the interaction. It now appears that the B cell alloantigen 883 may be very important in this regard with respect to acute rheumatic fever.

developed mouse monoclonal anti-883 typing reagents. There are indeed several possible levels at which a DR-like antigen might exert its effect on the anti-streptococcal immune response and thus significantly influence the basic disease process. These various levels are diagrammed in Figure 2.

In conclusion, I have alluded to a number of fascinating problems still presented by the clinical picture and subsequent course of acute

rheumatic fever. I have attempted to sketch out, perhaps in overly bold strokes, the concept of molecular mimicry and its possible application to rheumatic heart disease. Finally, I have pointed out a number of questions and problems that still remain the target for future work.

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The College of Physicians of Philadelphia

PORTRAIT CATALOGUE

THE College of Physicians of Philadelphia, established in 1787, is one of the oldest medical organizations in the United States. Its founders were leading members of the American medical profession in the eighteenth century; among them were John Morgan, Benjamin Rush, and Adam Kuhn. The College was from its inception a professional society modeled along the lines of the Royal College of Physicians in London. For nearly two hundred years it has been a complement to the medical schools in Philadelphia.

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Otto Neubauer: A Neglected Biomedical Scientist

BERNARD SCHEPARTZ

SUMMARY: An account of the career of a biochemist-clinician who was born in Austria and educated in Prague; he established his reputation in laboratories and clinics in Basel and Munich. A veteran of the German army in World War I but of Jewish descent, he was forced to take refuge in England in 1939. His meticulous studies of amino acid metabolism, glucuronide conjugation, and liver metabolism have served as critical stepping-stones for subsequent investigators. He was also highly respected as a bedside physician.

ON November 24, 1957, Otto Neubauer died in Oxford, England, at the age of 83. The London *Times* eventually published a simple death notice, presumably inserted by his widow.[1] No full obituary appeared in the English-language press. The *Münchener Medizinische Wochenschrift*, to which Neubauer had been a frequent contributor, published a short notice of his death with some indication of his scientific standing,[2] followed in a subsequent issue by a memorial essay written by one of his former students.[3]

Thus ended the life of a man whose accomplishments included (but, as will be seen, were not limited to) pioneering experiments in the fields of glucuronide conjugation, amino acid metabolism, and blood transfusion; a creatinine-loading test for kidney function; and several comprehensive review articles on amino acid metabolism which were of signal use to those of us who were entering that field in the 1940s. It should be noted also that two subsequent Nobel prize-winners found it profitable to collaborate with Neubauer early in their careers. This biographical note is intended to make amends for what appears to be undue neglect of a physician and scientist whose memory deserves better.

Brief biographical information on Otto Neubauer may be found in several international compendia,[4–6] in a volume memorializing the former Jewish culture of Munich,[7] and in an inaugural dissertation on the former faculty of the Ludwig-Maximilian University of Munich.[8]

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The Early Years

Otto Neubauer was born of Jewish ancestry on April 8, 1874, in Karlsbad (Czech: *Karlovy Vary*), in what was then the Austrian province of Bohemia.[3] His father, Wolfgang, was a practicing physician. His mother, Hedwig (née Sadler), came from the small town of Koenigsberg (*Kynsperk*) near Eger (*Cheb*) in Bohemia (pers. comm., Josef Ehrlich). In addition to Otto, the children included August, who became a translator and lived in Switzerland; Ernst, a physician who practiced in Karlsbad in the summer and in Vienna in the winter; and a daughter, Berta. The family lived in an old, narrow house on Die Alte Wiese. The women of the family dressed in the height of fashion; Dr. Wolfgang affected a Bismark beard. Hedwig was a strong-willed mother who insisted that Berta must marry before the sons; since Berta did not marry, those sons who did were married very late in life and had no children (pers. comm., Dr. Walter Ehrlich). Hedwig, Berta, and Ernst eventually died in concentration camps (pers. comm., Joseph Ehrlich).

After attending the schools of his native city, Otto Neubauer studied at the humanistic gymnasium in Komotau (*Chomutov*), where, in July, 1892, he passed the examination (*Abiturienten-Examen* or *Maturitätsprüfung*) qualifying him for admission to a university.[9]* From October, 1892, he studied medicine for ten semesters at the Carl-Ferdinand University in Prague. In addition to attending lectures and clinics, he studied at the Medical-Chemical Institute under Karl H. Huppert, a renowned clinical chemist and editor of a well-known manual on urine analysis. During this period, Neubauer schooled himself thoroughly in the techniques of analytical and synthetic organic chemistry. He wrote that Huppert introduced him to the scientific method and remained a "fatherly friend until his death." After passing the prescribed examination at Prague University on June 16, 1898, Neubauer graduated as Doctor of General Medicine and also received his certification (*Approbation*) as practicing physician for Austria.

From October 1, 1898, to October 1, 1900, Neubauer worked as assistant at the Pharmacological Institute of the German University of Prague, followed by a year in which he augmented his medical training by serving as voluntary assistant in the First Medical Clinic of the General Hospital of Prague. This period also marked the beginning of his published research.

* Copy of this reference kindly provided by Professor Laetitia Boehm.

In 1899 Neubauer published a preliminary note[10] followed in 1900 by a full-sized paper on the porphyrinuria induced by Sulfonal poisoning.[11] He found that bile was an important avenue of excretion, that the porphyrin in question was not a normal metabolite of hemoglobin, and that the porphyrinurogenic effect of compounds related to Sulfonal was not related to their hypnotic efficacy.

Neubauer's work at the Pharmacological Institute concluded with a comprehensive study of the pathway of detoxication by glucuronide conjugation.[12] He found that almost all aliphatic alcohols, ketones, certain unsaturated hydrocarbons, and many aldehydes followed this pathway, some after metabolic alteration. This paper has had a long scientific life. It was quoted four times in a 1959 treatise on detoxication mechanisms[13] and has been referred to in journal articles as late as 1977. It is probable that at the time of publication of this paper, Neubauer had already left Prague for Basel (see below), since he is listed on the title as "former assistant of the Institute."

Basel and Munich to World War I

In 1901 Friedrich von Müller, then Chairman of Medicine at the University of Basel, received a letter from Huppert in Prague, recommending Neubauer, as his most talented student, for a post in the Basel Clinic.[14] The recommendation was acted upon positively, since von Müller had a strong interest in the application of chemical methods to the elucidation of clinical problems, and since Neubauer was reputed to be an outstanding chemist, yet dedicated to internal medicine. According to von Müller, Neubauer "developed into my most outstanding student. . . loyally left Basel with me . . . helped me set up my clinic in Munich . . . [and] was my assistant for twelve years. . . . In addition to his eminent chemical abilities, he was an outstanding teacher and genial diagnostician and therapist."

Neubauer joined von Müller in Basel in the fall of 1901 as volunteer in the Medical Clinic. From this clinic, Leo Langstein and Otto Neubauer published a preliminary note on autolysis in the puerperal uterus.[15] In 1902 von Müller left Basel to head the Second Medical Clinic of the Hospital "Left of the Isar" (*Krankenhaus links der Isar*) in Munich, along with Neubauer and several other members of the clinical research unit which had been assembled in Basel. Neubauer was given the post of voluntary physician and was later promoted to assistant physician.[9]

Returning to more strictly chemical topics, Neubauer demonstrated in 1903 that the newly-described Ehrlich Color Reaction (red color with hydrochloric acid and dimethylaminobenzaldehyde), as produced by urine, was due to urobilinogen.[16] He concluded from tests with various compounds that the reaction indicated the presence of pyrrole groups. This paper was quoted as recently as 1982 in a review of the Ehrlich Reaction.[17]

At a scientific meeting in 1904, Neubauer discussed the significance of the osmic acid staining reaction.[18] Investigations conducted with Langstein showed that the reaction was given by all substances containing double or triple bonds between two carbon atoms.

Taking advantage of the availability of an alcaptonuric patient at the Basel Clinic, Neubauer and Wilhelm Falta (who had remained behind when von Müller, Neubauer, and the rest of the group moved to Munich) investigated which aromatic acids caused increased excretion of homogentisic acid when the aromatic acids were fed to the patient.[19] From their experiments, the authors concluded (correctly) that the first step in the catabolism of the aromatic amino acids was deamination by a process other than reduction, but (incorrectly at the time) chose hydrolysis as the mechanism. Neubauer and Falta explicitly stated that they were following the principle of parsimony in regarding homogentisic acid as a normal intermediary metabolite abnormally blocked from further catabolism in alcaptonuria, rather than an abnormal metabolite abnormally blocked.

In a subsequent paper, Neubauer presented his observations on a case of essential fructosuria, which he contrasted with a case of "mixed mellituria."[20]

The Royal Bavarian State Ministry of the Interior, in July of 1906, granted Neubauer's petition for certification (*Approbation*) as physician in the German Empire.[9] He was designated assistant in the Medical-Clinical Institute of the University in August of the same year. Also in 1906, Neubauer published his findings on four severely diabetic patients whose ketonuria was reduced significantly by administration of alcohol, although little or no effect was seen in cases of mild diabetes or in normals.[21] In addition to this work, a study of seven cases of eosinophilic enteropathy was undertaken by Neubauer and Stäubli; similarities were noted with bronchial asthma.[22]

In 1907 Neubauer, along with L. Flatow, published the second of his major papers on amino acids and their metabolites.[23] A compound called "uroleucic acid" had been regarded as a possible precursor of homogentisic acid, or at least as an accompanying excretory product in alcaptonuria, from a few cases of which it had been isolated in various states of purity. Neubauer had, up to this time, considered this compound to be a valid precursor of homogentisic acid, since his former mentor, Huppert, had reported that one of the earlier preparations, on analysis, had the structure, 2,5-dihydroxyphenyllactic acid.[24] Neubauer and Flatow disproved this contention by synthesis of the acid having this structure and demonstrating that it and a series of related acids which they also synthesized had properties different from those reported for the elusive "uroleucic acid." The history of this postulated metabolite has been reviewed by Knox.[25]

At about this time Hans Fischer, whose training had been primarily in organic chemistry, joined the Munich group in order to enlarge his knowledge of the medical sciences.[14] Although initially assigned by von Müller to problems concerning stomach contents in gastric carcinoma, he eventually began his work on bile pigments and porphyrins which led to the Nobel prize in chemistry in 1930. From the earlier experiments, Neubauer and Fischer reported at a meeting of the Munich Medical Society the preliminary finding that, in contrast to the contents of normal stomachs, carcinomatous gastric contents had the ability to split peptides of tryptophan.[26]

Neubauer wrote his inaugural dissertation (*Habilitationsschrift*) in 1909, thus qualifying for appointment to an academic post. The thesis was entitled, "On the Breakdown of Amino Acids in the Healthy and Ill Organism." In the accompanying autobiographical note,[9] he enumerated his teaching experiences in both Prague and Munich as conducting a chemical microscopy course for sub-assistants; taking part in courses instituted by the Docent Society in therapeutic technique, diagnosis of internal diseases, and metabolic diseases; holding, at the request of the Medical Society, a physicians' course on medical chemistry; and instructing, in the out-patient and laboratory division of the Medical-Clinical Institute, beginners in both scientific research as well as practical diagnosis and therapy. The note concluded with a list of Neubauer's major publications from 1900 through 1907. He was named *Privatdozent* (unpaid lecturer) by the University of Munich in February, 1909 (pers. comm., Prof. Laetitia Boehm).

The subject matter of the foregoing thesis also was treated in a paper of 1909 bearing the same title.[27] For the purposes of this investigation, the alcaptonuric patient previously tested in Basel was housed temporarily in the Munich Clinic. From the results of these experiments, Neubauer concluded that the initial step in the catabolism of the aromatic (and probably all) amino acids was oxidative deamination to the corresponding keto acids, followed by oxidative decarboxylation to form acids of one less carbon atom. This concept, with appropriate modification, remains valid today.

It was also evident from the experiments that the p-hydroxyl position was essential to the formation of homogentisic acid, reinforcing the so-called "p-quinol" theory and shift of the side-chain on the ring as the mechanism of the reaction.

Neubauer included in the paper a metabolic flow-chart for phenylalanine and tyrosine. This, according to La Du,[28] was the "first such scheme for any of the amino acids," and with modifications which Neubauer made in a later publication has survived with few additional alterations up to the present time.

It may be noted finally that, in this paper, Neubauer reiterated his belief (again citing the principle of parsimony) that homogentisic acid was a normal metabolite, subject to an abnormal blockage in alcaptonuria, not a substance produced in an aberrant pathway and in addition abnormally blocked from further metabolism. In 1911, H. D. Dakin espoused this latter view,[29] but subsequent research has vindicated Neubauer's position. The history of this area of amino acid metabolism has been reviewed by Knox.[25]

Later in 1909, Neubauer and Fischer presented the details of their method for diagnosis of gastric carcinoma,[30] which had been outlined earlier in a preliminary note.[26]

Neubauer returned to the topic of amino acid metabolism in 1910, when he and Walter Gross demonstrated that p-hydroxyphenylpyruvic, but not p-hydroxyphenyllactic, acid was converted by the perfused dog liver into ketone bodies.[31] This strengthened the view that the initial step in tyrosine metabolism was an oxidative (rather than hydrolytic) deamination to the corresponding keto acid.

In the paper immediately following, Neubauer and Fischer reported that the dextrorotatory isomer of the "unnatural" substrate, phenylaminoacetic acid, was converted by the perfused liver partly to a nitrogenous product (the subject of a later publication), and partly

oxidatively deaminated to phenylglyoxylic acid.[32] The latter could be altered further by asymmetric reduction to levorotatory mandelic acid, although a small portion was also oxidized to benzoic acid. The authors concluded that the liver was a major site of deamination of amino acids.

At a medical society meeting in 1910, Neubauer presented evidence supporting the theory that, in the diabetic, a single blocked metabolic reaction caused the accumulation of both acetoacetic and beta-hydroxybutyric acids, because the two compounds were involved in an *in vivo* reversible equilibrium.[33]

In a continuation of the work on the metabolism of phenylaminoacetic acid begun with Hans Fischer, Neubauer and Otto Warburg identified the nitrogenous product formed by liver perfusion as dextrorotatory N-acetylphenylaminoacetic acid.[34] This was among the earliest demonstrations of a synthetic or anabolic reaction performed by an organ *in vitro*. (In 1931 Otto Warburg was awarded the Nobel prize in physiology and medicine for his work on tissue respiration and oxidative enzymes.)

With the collaboration of Konrad Fromherz, Neubauer compared the pathways of catabolism of amino acids in yeast with those which had been established in the animal organism.[35] The deamination of amino acids by yeast was oxidative, producing the expected keto acid which was, however, non-oxidatively decarboxylated to the aldehyde of one less carbon atom. This, in turn, was reduced to the alcohol, thus counter-balancing the initial oxidation.

In an evaluation of their peptidase test for gastric carcinoma, Neubauer and Fischer tabulated the results from laboratories other than their own and reviewed the various possible sources of error.[36] Neubauer attended a medical congress in Wiesbaden in the Spring of 1911. Although he presented no paper, he participated in several discussion periods following the papers of others.[37] He commented on the acid reaction of urine samples from patients with uric acid stones, on the fact that the enhanced protein-digesting ability of the stomach with carcinoma is not the cause of the deficiency of hydrochloric acid, that there are no experimental grounds for assuming that the formation of uric acid from purine bases is an equilibrium reaction, and that investigations of ammonia excretion in the urine must differentiate between that ammonia formed for the purpose of neutralizing acids and that formed for other functions.

There also appeared in 1911 the first of three reviews by Neubauer on amino acid metabolism which were published as chapters in multi-volumed *Handbücher*.[38] In this relatively brief example (30 pages), he summarized the current status of the field with reference to bacteria, fungi, yeast, higher plants, lower animals, and mammals.

On August 20, 1911, Neubauer was appointed by the University to a rank equivalent to the American assistant/associate professorship (*ausserordentlicher Professor*; pers. comm., Prof. Laetitia Boehm), and shortly before the outbreak of World War I, Neubauer published a creatinine-loading test for the diagnosis of renal disease.[39] This test remained popular until the advent of renal clearance techniques. D.D. Van Slyke, touring Europe in 1914 to investigate cooperative ventures between biochemists and clinicians, "was especially impressed by the arrangements between biochemist Otto Neubauer and internist Friedrich von Müller."[40]

World War I Through 1933

Early in World War I, Neubauer wrote an obituary note for Friedrich Meyer-Betz, who had been killed at the front.[41] Meyer-Betz had been a member of the Munich Clinic group from 1909 to 1912, had worked with Hans Fischer on bile pigments and porphyrins, and, by self-administration, shown that humans could be photosensitized by porphyrins, a phenomenon already demonstrated in laboratory animals.

Neubauer himself was called up for military duty in 1915, serving as medical director of the division of internal medicine in a reserve military hospital in Munich and as consulting internist to the Third Bavarian Army Corps.[3] At this time he published a lecture on the handling of intestinal diseases for the use of military physicians in the field.[42]

As chronicled by von Müller, in the years around 1914 dissatisfaction and dissension began to mar the atmosphere of the Second Medical Clinic.[14] By that time Neubauer had been with von Müller for twelve years, was over-age for an assistant, and deserved to be named to a full professorship (*Ordinarius*). Neubauer and another assistant in the same circumstances blamed von Müller for not furthering their advancement. In Neubauer's case, von Müller attempted to secure a professorship for him at Augsburg. This fell through because, in von Müller's words, Neubauer was "a Jew and a foreigner." The former appellation must be construed as a comment on the politico-religious climate of Bavaria at the time, since von Müller was not at all anti-Semitic and, indeed, had

always had many Jewish colleagues and students in his group. The term *foreigner* is an additional comment on the Bavarian scene, since it undoubtedly refers to Neubauer's place of birth, which was outside the boundaries of the German Empire, albeit in German-speaking Bohemia. Eventually, in 1918, von Müller was able to place Neubauer in the position of Chief Physician of the Second Medical Division of the City Hospital, Munich-Schwabing, a post not carrying the title of full professor.

This sorry tale is paralleled by a story circulated in the related Ehrlich family, to the effect that the Bavarian Minister of Culture is said to have offered an *Ordinarius* to Neubauer in return for the latter's conversion to Christianity (pers. comm., Dr. Walter Ehrlich). No other course was said to have been possible for a Christian-Socialist Minister of Catholic Bavaria. The offer was refused.

At any rate, Neubauer spent the rest of his professional career in Munich at the post in Schwabing. Whether due to the pressure of administrative duties, a desire for more clinical work, or frustration from his failure to secure the coveted *Ordinarius*, from this time on, Neubauer's published laboratory research diminished almost to the vanishing point. However, according to his student, Valentin, he invented an aneroid sphygmomanometer, designed a blood cell-counting chamber, and introduced a micropipette and a microburette into blood analysis.[3]

As for his teaching, Valentin quotes the opinions of Neubauer's students: "an outstanding clinical chief; kind, ready to help, modest, calm at the bedside, thorough and certain in his recognition of clinical manifestations and in diagnosis, amiable, but nevertheless somewhat aloof and reserved and not easily approached in a personal way outside of the workplace."

Neubauer's contributions to the literature for the period from 1918 to 1930 only consisted of two review articles; however, these exerted considerable influence on later investigators who entered the field of intermediary metabolism, particularly of amino acids. The first of these papers was a 136-page review of the methods for research in intermediary metabolism, ranging from *in vivo* experiments on the entire organism and its easily accessible fluids and excreta down the scale to *in vitro* experiments with tissue brei.[43] The second, of 319 pages, was a masterful summary of the knowledge of the time concerning intermediary metabolism of proteins and amino acids.[44]

Neubauer's last laboratory research was published in 1930, with Heinrich Lampert as co-author.[45] After establishing a direct relationship between the wettability of various solid substances and their acceleration of the coagulation of blood in contact with them, Neubauer and Lampert constructed blood-transfusion equipment (such as syringes, beakers, and burettes) from "Athrombit," a synthetic phenol-formaldehyde resin. Many transfusions were performed with this type of equipment, mostly without complications.

Lampert continued his studies on blood coagulation independently and in 1931 published a book on the subject. This was reviewed by Neubauer in 1932, in what was to be his final contribution to the German medical literature.[46] Shortly thereafter, at a meeting of the Bavarian Surgical Society, Neubauer discussed the topic of blood transfusion in internal medicine.[47] This lecture was to have been expanded into a paper for publication in the same journal; it never appeared.

On April 7, 1933, the Nazi government passed a law denying civil service employment to Jews. On May 30, Neubauer was summoned to a meeting with the rector of the University. The brief proceedings were documented.* Neubauer was asked whether he acknowledged his non-Aryan ancestry, to which he replied in the affirmative. He was then asked whether he could offer grounds for any exception to the law of April 7. He noted his military service in World War I and his academic service since his *Habilitation.* The document concluded with a note by the rector that Neubauer was not lecturing that semester.

On June 27, 1933, Neubauer was dismissed from the Bavarian State Civil Service (i.e., from his University post; pers. comm., Prof. Laetitia Boehm). This news was published in the *Münchener Medizinische Wochenschrift* of July 7, 1933.[48] On July 14, 1933, Neubauer was discharged from the Medical Examination Board of the University (pers. comm., Prof. Laetitia Boehm). In the same year, his connection with Schwabing Hospital was severed.[8]

Emigration and the Oxford Years

There is little published information concerning Neubauer's life from 1933 until his emigration from Germany. His loss of professional status may be followed in the German Medical Registry, which, having

* Copy kindly provided by Professor Laetitia Boehm.

noted his full academic and hospital affiliations in previous years, listed him simply as Professor of Medicine at his home address in 1933 and 1937.[49]* His name appeared on a list of displaced German scholars compiled in London in 1936.[50]

The Society for the Protection of Science and Learning aided in efforts to secure Neubauer's departure from Germany (pers. comm., Dr. Egon Radvany and Jean Loudon).† Professor (later Sir) Ernest L. Kennaway headed a committee of British physicians formed to sponsor Neubauer's transfer to England. Negotiations lasted from late 1938 well into 1939, due to reluctance of the German authorities to grant permission for Neubauer and his newly acquired wife, the former Lily Cassirer, to leave Germany. Fortunately, these efforts succeeded before the outbreak of World War II.

The Neubauers settled in Oxford, where, in 1942, Otto Neubauer resumed the practice of medicine, appearing in the British Medical Register on the "Foreign List" (pers. comm., Jean Loudon). Among his patients were the Russian painter, Leonid Pasternak, and the parents of Lady Simon. Pasternak's daughter recalls Neubauer as having been very serious, modest, and most devoted to his wife, whose health seemed to be fragile (pers. comm., Josephine Pasternak). Lady Simon mentions that her father was pleased to have a German-speaking physician (pers. comm., Lady Simon [née Charlotte Muenchhausen] via Jean Loudon).

Dr. H. K. F. Blaschko encountered Neubauer almost daily in the Radcliffe Science Library, where the latter busied himself reading and writing (pers. comm., via Jean Loudon). Blaschko, who recalls being influenced by Neubauer's papers, remembers him as a "very distinguished person . . . with large, friendly brown eyes . . . [and] a long white beard . . . [who] wore a white linen jacket in summer, and a hat, and carried a continental bag."

Neubauer's labors in the library culminated in two publications, the first being a lengthy review of arsenical carcinogenesis.[51] This project was undertaken at the suggestion of Sir Ernest L. Kennaway (pers. comm., Dr. Joan Faulkner [Lady Doll]). Written with Neubauer's usual encyclopedic attention to detail, this article shares the characteristic

* Copies of relevant pages kindly provided by Professor H. Goerke.

† The records of the Society concerning the emigration of Otto Neubauer are deposited in the Bodleian Library, Oxford.

longevity of many of his earlier papers; it was cited 32 times in the period from 1975 to 1979 and four times as recently as 1982.[52,53]

Also at Sir Ernest's suggestion, Neubauer supplemented the foregoing review with a bibliography in book form of carcinogenesis by chemical compounds, covering the literature through 1947.[54] This mammoth work, which was supported by grants from the Donner Foundation and the British Empire Cancer Campaign, was completed by Phyllis M. Coombs of the library staff of the Chester Beatty Research Institute after Neubauer's final illness and death.

After her husband's death, Lily Neubauer left Oxford to live with a member of the Cassirer family in Cleveland, Ohio (pers. comm., Josephine Pasternak). Some laboratory notebooks and miscellaneous papers apparently were left in the attic of the home in which the Neubauers last lived. These were moved to a nearby address, but were located recently and are now deposited at the Wellcome Unit for the History of Medicine, Oxford (pers. comm., Jean Loudon).

This memorial essay may well conclude with the words of Neubauer's student, Valentin:

> *Unfortunately, his achievements did not receive the appreciation that they deserved.*[3]

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College Portraits
The Men On The Walls—V
William S. W. Ruschenberger

JOHN L. McCLENAHAN

HIS portrait was finished a scant ten days before he died, "feeble in body," in the words of a friend, "but with his old cordiality and affection."[1] The artist, John Lambert, Jr., saw a heavyset figure, white-bearded, judgmental, heavy-lidded, lips curved in an expression of mild distaste — formidable.

The archives overflow with accounts of Dr. Ruschenberger's voyages, the scope and volume of his writing, his singular gifts as a natural scientist, his notable success as a naval surgeon. He could have claimed modest fame simply from his account of the first hundred years of the College of Physicians of Philadelphia, a mélange of anecdote, narrative, and chronology. But readers who have accompanied him to Muscat, around Cape Horn, and through the halls of the Philadelphia Naval Hospital will pause at the phrase, "cordiality and affection." By general agreement he was an austere, commanding figure of dual temperament, a poet contending with a martinet.

He was born in Bridgeton, N.J., at the mouth of the Delaware, on September 4, 1807. He was a posthumous child; his father, Captain Peter Ruschenberger, had been lost at sea three months previously with his entire crew. We have little information of his early years beyond assurance that he was educated in New York and Philadelphia and at one time "studied Latin with an Irishman of culture." In 1826 he enlisted in the navy as a surgeon's mate, cruised the Pacific on the U.S.S. *Brandywine,* and entered the University of Pennsylvania on returning home. After winning his M.D. degree in 1830, he reentered the navy as a surgeon and was assigned to the sloop *Falmouth* of the Pacific squadron. On this voyage he translated an account of Chilean flora, his first published

1. John J. Ashhurst, "Memoir of W. S. W. Ruschenberger," *Transactions and Studies of the College of Physicians of Philadelphia*, ser. 3, 18 (1896): xxxv–xli.

Dr. McClenahan is Editor of *Transactions and Studies of the College of Physicians of Philadelphia.*

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work, and set down notes for *Three Years In the Pacific: Including Notices of Brazil, Chile, Bolivia and Peru*. In this book we discover the gentle, graceful literary style that marked so many of his reports on natural history. "The coca possesses a slightly aromatic and agreeable odor, and when chewed, dispenses a grateful fragrance; its taste is moderately bitter and astringent, and it tinges the saliva of a greenish hue. Its effects on the system are stomachic and tonic and beneficial in preventing intermittents, which have always prevailed in the country."

In 1839, after a third tour of duty in the Pacific, he married Mary Baynton Wister. Of their four children one, a son, survived.

Dr. Ruschenberg's hospital posts included the Boston Navy Yard, the New York and Brooklyn Naval Hospital, and the Philadelphia Naval Hospital. While stationed in New York he founded the U.S. Naval Laboratory for supplying and improving pharmaceuticals and instruments.

While assigned to the Philadelphia Naval Hospital as commanding officer, he joined the Academy of Natural Sciences, of which he was eventually elected president. From 1869 to 1883 he was president of the College of Physicians of Philadelphia and for the last ten years of his life was a vice-president of the American Philosophical Society. In 1871 he withdrew from military life with the rank of Commodore, U.S.N. (Retired).

Whatever his topic, Dr. Ruschenberger's prose was leisurely, detailed, and indefatigable. His "Sketch of the Life of Caspar Wister, M.D." begins with a comprehensive study of his subject's great-great-grandfather.[2] No detail, however exotic, escaped his eye, and his accounts of foreign lands abound with information of costume, industry, religion, folkways, etiquette, geography, and weather. It may be significant that his favorite novel was *Robinson Crusoe*. His five books on natural history range in subject from animal physiology to mammology, conchology, and the lexicon. He cited references in French, Spanish, and Italian sources. Many of his passages are tinged with a certain wryness: "Everyone seems rather disposed to indulge in the quiet, animal enjoyment of eating, drinking, smoking, lounging and sleeping . . . and hence the embonpoint among women and obesity among men. . . ."

2. In *Transactions and Studies of the College of Physicians of Philadelphia*, ser. 3, 12 (1890): lix–xc.

His closest friends and colleagues confess to a lingering perplexity as to Dr. Ruschenberger's character. We read of his "inflexible and unswerving devotion to duty [that] imparted to his actions an air of harshness which they did not contain" followed by protestations of kindness, affability, and sympathy. Passages in his common place book,[3] begun at sea in 1827, swerve from lyric imagery to doggerel of startling vindictiveness:

To E—
The gaudy smiles that round the lips
In joyous gambols play,
Are nectar to my gazing eyes
And drive dull thoughts away.

is followed, hard on, by an untitled piece that reads in part:

H— A— is dead at last
And may the devil hold him fast . . .
To the moon—or more distant place
Where he may never show his face
To any of the Christian race . . .
Or on India's burning plain
May the sun melt out his brain . . .

We come upon one small, dark, poignant husk among the trophies of this admirable achiever—a confession that brings him close to us. It is a letter among his papers written in a neat, firm hand:

> My earliest recollection is that I waked up one morning on a low trundle bed, and was alarmed by the gaze of a man who stood in a closet near, and partly concealed by the door which moved and closed when I began to cry. The hour might have been eight or nine o'clock. My mother came to me from below, and attempted to sooth [*sic*] me; but I fancied there was a ghost in the closet, and after some time was sufficiently calm to communicate this notion to my mother. To convince me of my folly she opened the door of the closet, screamed and neighbors came to her assistance but not in time to arrest the

3. This book can be found, with other papers of Doctor Ruschenberger, in the Historical Collections of the College of Physicians of Philadelphia.

ghost who rushed out of the house . . . I was then about three years old, and possibly my notion of a ghost was derived from listening to stories of being threatened with being run off by some mythical being if I were naughty. Be this as it may, the frightful impression has never deserted my memory, and now, December 1859, I can distinctly see the man standing in the closet by the feeble light of a tallow candle which stood burning upon the hearth close to his feet. . . ."

535 Telner Street
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Portrait of William S. W. Ruschenberger, painted by John Lambert, Jr. (courtesy of The College of Physicians of Philadelphia).

REVIEW

VAILLANT, GEORGE. *The Natural History of Alcoholism: Causes, Patterns, and Paths to Recovery.* Cambridge: Harvard University Press, 1983. 359 pages. Price $25.00.

Reviewed by JOHN A. KOLTES

IN the course of human history, mankind periodically has been devastated by many plagues—wars, famine, disease, all manifestations of human suffering. Included high on the list of these tragic ills must be placed four-square the problem of alcoholism. Certainly this scourge of civilization has wreaked havoc on untold numbers of people, both those who are afflicted with the disorder and those who suffer the consequences of the disturbed behavior of the alcoholic person.

Dr. Vaillant has undertaken a teleological approach to the nature of alcoholism. This is a monumental effort, for no one to date has offered either a satisfactory explanation of the genesis of this problem or (even less) has provided a therapeutic addition to the very modest armamentarium which is available to the clinician. Careful note of this is made by the author, who has introduced an approach different from the conventional retrospective study.

The present study is the reverse of the far more common retrospective ones, hundreds of reports on which are available. The data for the book was obtained from an ongoing study of 660 men that is known as the Harvard Medical School Adult Development Project. The lifestyles and illnesses of these men were observed for more than 40 years. At its beginning, the group was composed of 204 college students and 456 inner-city boys so that the author could have the opportunity to acquire information about many types of health and habits. In addition, he studied a cohort of 100 alcohol-dependent men and women for eight years.

Dr. Koltes is Clinical Professor of Psychiatry at Jefferson Medical College and Director of Psychiatry at Chestnut Hill and Roxborough Hospitals.

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Certain questions were postulated that the study was aimed to answer:

1. Is alcoholism a symptom or a disease?
2. Does alcoholism usually get progressively worse?
3. Are alcoholics, *before* they begin to abuse alcohol, different from nonalcoholics?
4. Is abstinence a necessary goal of treatment, or can insisting on abstinence sometimes be counterproductive?
5. Is returning to safe social drinking possible for some alcoholics?
6. Does treatment alter the natural history of alcoholism?
7. How helpful is Alcoholics Anonymous in the treatment of alcoholism?

Answers to each of these questions are documented. Some results are predictable from clinical experience; others, rather the opposite of what one might expect.

The complexity of alcoholic addiction persists. The definition of the condition alone defies agreement among clinicians and researchers. Some authors cite it as a disease; others, as a sin. Some even see it as non-existent as an entity, but part of a larger problem. As the author notes, "with the passage of time, some alcoholics will die, some will become abstinent, some will return to social drinking, and some will be unchanged. The proportion of alcoholics following any single route is unknown. Positions taken on the progressive nature of alcoholism often depend more upon the treatment orientation of the observers than upon the adequacy of their data. Whether or not alcoholism is inevitably progressive can only be determined by following large numbers of alcoholics for long periods of time without significant attrition and without the bias that results from selecting a clinic population" (page 5).

Dr. Vaillant sees alcoholism as a disease and adopts the medical model as an approach, while noting, of course, the limitations of this choice. As he suggests, a sociological model could be equally satisfactory. His research has supported other's findings: that men with nutritional disorders, inferiority feelings, phobias, or glandular disorders were not more likely to develop alcoholism. On the contrary, men with strong feelings of dependence, oral tendencies, heavy smoking, or compulsive eating were actually less likely to develop alcoholism than men who were considered to be reasonably mature. This is one of the crucial facts revealed in the longitudinal studies.

Finally, we come to the diagnosis. The definition of alcoholism is an elusive one, and often depends on the biases of the observer. The usual definition is based on the amount that the person drinks and the frequency of drinking, but this is really of little value in determining the diagnosis since such a definition fails to take into account the behavior of the drinker. To define alcoholism, the author resorts to the use of behavioral terms rather than purely medical ones (the existence or absence of specific symptoms). In his opinion, the diagnosis of alcoholism can only be based on a continuum of behavior, not on quantity or frequency of ingestion of alcohol, and the condition is considered a behavioral disorder in terms of the complications of life that develop from the continued use of alcohol.

As in the last book of the Old Testament of the Bible, the author ends on a note of pessimism springing from the overwhelming complexity of the problem and the difficulties in its management. But like the author of the last book of the New Testament, he sounds a clarion call for more optimism and more hope for success in meeting the challenge and finding a cure that has eluded us through, lo, these many centuries.

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REVIEW

ROSEN, GEORGE. *The Structure of American Medical Practice, 1875–1941.* Ed. Charles E. Rosenberg. 152 pages, illus. Philadelphia: University of Pennsylvania Press, 1983. Price $22.50, cloth; $9.95, paper.

Reviewed by PALMER H. FUTCHER

THIS volume presents an expansion of two of the three presentations in 1976 comprising the initial series of the Richard H. Shryock Lectures at the University of Pennsylvania. The author, George Rosen, then professor at Yale in the fields of epidemiology, public health, and the history of medicine, died in 1977. A draft of the final chapter, which was to advance the subject to 1975, was not available to Editor Charles E. Rosenberg, professor of history at the University of Pennsylvania and a Fellow of the College of Physicians. Dr. Rosenberg, a leading historian of social aspects of American medicine, has contributed a prologue describing the practice of medicine in America from 1800 to 1875 and a useful bibliographic note on the field of social medicine.

Dr. Rosen's book offers a concise, readable, documented, and indexed panorama of medical and related educational practice in America over the years 1875–1941. It seriously engages the interest of those who are already partly familiar with its content and will very likely appeal to those younger planners who desire a background on this field. Like Raymond Pearl in 1925, Rosen has emphasized consistently (but not inappropriately) that the response of the physicians of the period to suggested innovations in the delivery of medical care was largely motivated by their estimate of the effects on their earnings.

Issues reported upon include the replacement of the patient's home by the physician's office as the site of practice (necessitated by advances in the technology of diagnosis and treatment); the rapid increase in the availability of hospitals; the urbanization of the population; the disputes between physicians and local health departments over responsibility for care; and the oversupply of practitioners, many of them "irregular" or poorly trained, with consequent cutthroat competition. Responses

Dr. Futcher is Clinical Associate Professor of Medicine at the University of Pennsylvania; he served as Executive Director of the American Board of Internal Medicine, 1967–1975.

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included the AMA's establishment of its Council on Medical Education in 1904 with resulting improvement in educational standards, more stringent licensing requirements, and the Carnegie Foundation's Flexner report of 1910. Consequently, the 131 medical schools of 1910, graduating 4440 physicians annually, had been reduced to 81 schools graduating 2529 physicians in 1922.

The AMA first listed approved internships in 1914, when Pennsylvania instituted the requirement of an internship for licensure. Responding to an increase in the number of residencies, the AMA initiated its listing of approved residencies in 1927. The report on the Commission on Medical Education of 1932, a body chaired by President Lowell of Harvard, recommended a further decrease in the production of physicians. The multiplication of self-designated specialists led to the institution of specialty examining boards, in part with the unrequited hope of decreasing the ranks of the specialists. The American Board of Ophthalmology, under a different title, was established in 1916; most of the other boards began in the twenties and thirties.

A small sample of various items of interest conveys the scope and style of Rosen's work.

Item relating to the ardors of home-visit practice: Weir Mitchell one Sunday in 1864 in Philadelphia saw twenty city patients and four in the country.

Items related to medical school admission practices: After World War I, the schools at Harvard, Columbia, and New York University, among others, imposed numerical restrictions on the admission of Jewish students. In 1938–39 there were only forty-five black students in the eighty traditionally white schools. Women comprised 4.4 percent of graduates of American medical schools over the period 1915 through 1932.

Item on incomes of practitioners: In 1929 one-quarter had net incomes below $2300; by 1933 the average net income had declined a further 40 percent.

Department of *déjà vu* for 1984 planners: Steps were taken to prevent any increase in, and eventual entry into the profession by, the 4371 Americans studying medicine in Europe between 1930 and 1933. Mirroring concerns that increased specialization would deprive patients of needed generalists, Dr. Charles L. Dana of New York in 1912 predicted that the well-trained internist would be the general practitioner of the future (shades of our current medical school divisions of

"general internal medicine"!). And the president of the AMA, Robert A. Pusey, pointed out in 1924 the complexities imposed on practice by "filling medical and quasimedical positions with laymen, by the employment of nonmedical clinical assistants as substitutes for interns, by having nurses take over many of the functions of the physician. . . ."

Rosen devotes his final pages to the quite routinely adverse response of the profession to the proposed sickness insurance increasingly desired in many quarters. Forerunners of such insurance included "contract practice" (in which a physician served the members of a group such as a lodge), the Mutual Medical Aid Association of Chicago (founded by two physicians in 1890), and efforts by Drs. A. T. Lytle of Buffalo in 1914 and S. S. Goldwater, health commissioner of New York City in 1915, to promote sickness insurance generally. The leadership supporting these proposals reflected a change in the leadership of medical practice in general which took place in the early years of the century—medical educators, increasingly employed full-time, did not seek the responsibility in local medical societies and in the AMA that was carried by educator-practitioners of an earlier day. Medical educators who, like Hugh Cabot later on in 1935, supported the expressed wishes of the public for sickness insurance, were politically ineffective. Rosen comments that, though "ideologically the medical profession favored competition, in practice, however, this meant competition on its own terms."

Opposition to social insurance was particularly strong in the midwest. Late wartime developments in Russia impaired the influence of such relatively liberal AMA leaders as Alexander Lambert of New York and in part inspired the instructions imposed by the Illinois State Medical Society upon its delegates to the AMA in 1920 that they oppose state medicine, compulsory health insurance, county and state health agencies, and "allied dangerous Bolshevicki schemes."

Had Rosen completed for this volume the final section of his 1976 Shryock Lectures, he might have updated his history of health insurance to include the launching in North Carolina by Dr. Wilbur C. Davison and others in the 1930s of a progenitor of our current Blue Cross plans. Though we lack in this volume those details, we have Rosen's summary for the period 1875–1941:

"Both the movement to reform medical education and the campaign for compulsory sickness insurance were products of the Progressive era. . . . Reform of medical education was undertaken when Progressivism

was at its peak, and with the support of most of those involved—organized medicine, medical schools, licensing authorities, and foundations. . . . Progressive liberalism received a mortal blow from the effects of World War I. As peace returned, projects pushed by Progressives crumbled before their eyes, among them compulsory insurance. . . . Like other groups in American society, a large body of medical practitioners experienced difficulty in adjusting to the rapid pace of social and professional change. . . . These changes were further strengthened by an increasing separation between academic physicians, oriented toward teaching and research, and those physicians who were oriented toward private practice. . . . By 1940, there remained unsolved problems and uncontrolled factors capable of upsetting the unstable equilibrium upon which they rested."

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REVIEW

LEE, JOSEPH K. T., STUART S. SAGEL, and ROBERT J. STANLEY, eds. *Computed Body Tomography*. New York: Raven Press, 1982.602 pp., illus. Price $79.50.

Reviewed by RODERICK L. TONDREAU

COMPUTED tomography (CT) was introduced in 1972 by Mr. Godfrey N. Hounsfield of the research division of the EMI Corporation, located near London. The first scanners were limited to examination of the head. For the first time, the ventricles of the brain could be seen without the introduction of air and the computed tomographic scanner was immediately hailed as revolutionary. Pneumoencephalography and ventriculography became obsolete, the number of radio-nuclide brain scans dropped to a mere fraction, and in many instances, cerebral angiography became unnecessary.

The Mallinckrodt Institute of Radiology of the Washington University School of Medicine in St. Louis acquired two of the early scanners in 1972 and installed a total body scanner in 1975. This book, written by thirty members of the radiological staff, documents the experience of almost a decade in the field of computed body tomography.

The first two chapters have to do with the fundamentals and applications of physics, instrumentation, and techniques. The bulk of the volume is divided into fifteen chapters relating to the normal and pathological anatomy of all of the structures of the body from the level of the larynx caudally through the thorax, abdomen, retro-peritoneum, spine, pelvis, and musculo-skeletal system. There are separate chapters on pediatric applications and radiation oncology.

The advantages of computed body tomography are well substantiated throughout the book. A few examples will be cited.

In the thorax, the greatest value of CT is in its evaluation of the mediastinum. When the standard chest X-ray does not solve a problem, CT can speed up the diagnostic process by supplanting multiple,

Dr. Tondreau is Emeritus Member of the medical staff and former director of the department of radiology at Holy Redeemer Hospital in Meadowbrook, Pennsylvania.

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previously used imaging studies such as conventional tomography, barium esophagography, radio-nuclide scintigraphy, and angiographic studies which together only establish localization of a mass.

Barium studies of the gastro-intestinal tract still provide the basic radiological methods of studying the hollow viscera but information is limited to the status of the mucosa and the caliber and contour of the bowel. CT adds information about the intramural and extramural structures.

Computed tomography is of great value in the assessment of inflammatory and neoplastic diseases of the pancreas but there is no evidence that the high mortality rate of cancer of the pancreas has been reduced by greater diagnostic accuracy.

In the urinary tracts, CT can differentiate renal cysts from solid tumors and in the case of the non-visualized kidney at urography, the site and cause of hydronephrosis can usually be determined.

Many patients are referred for CT examination because of back problems and in many of those with suspected intervertebral disc herniation the diagnosis is established without resorting to myelography.

"Comparative Imaging" is the title of a chapter which matches computed tomography with diagnostic ultrasound (US) and radio-nuclide imaging (RI). CT, US, and RI are highly accurate in diagnosing many diverse pathologic processes. The greatest impact of CT is in the visualization of the cranial contents. Ultrasound is limited by bone and air but has been a boon in the fields of obstetrics and gynecology because of the absence of ionizing radiation. Of the three modalities, RI provides the most information about organ function. CT is superior to US in the study of the adrenals and pancreas and superior to US and RI in detecting hepatic metastases from the breast and colon. No single imaging method has proven superior to the other two in all patients and in all clinical situations. Developments are continually taking place. Magnetic resonance imaging is not discussed in this book but within the next few years various centers will have had experience with this new modality so that comparisons can then be brought up to date vis-a-vis computed tomography, ultrasound, and radio-nuclide imaging.

Finally, there is a chapter on the economics and politics of the CT scanner. As the authors recount it, when CT was introduced it became a major topic of debate in congress, legislatures, and at cocktail parties. It was a symbol of extravagance to those worried about mounting health care costs. Physicians were accused of suffering from "CAT Fever" but

most of the critics had no responsibility for the care of the sick. All sorts of obstacles were placed in the paths of those seeking approval from various agencies to purchase scanners. Bureaucratic planners and politicians, among others, felt that CT represented the "inappropriate use of medical technology with its ultimate associated increase in costs." However, the CT scanner proved to be one of the great medical advances of all time for which Hounsfield shared the Nobel prize in medicine in 1979 with Allen M. Cormack, who had done investigative work in the mathematics of image reconstruction in the 1950s. In spite of the opposition, nothing could stop development and distribution of the CT scanner throughout the country and the world.

Computed Body Tomography is an excellent and comprehensive work. The text is well written, the illustrations are of the highest quality, and an extensive bibliography follows each chapter. It is highly recommended to trainees, to experienced radiologists, and to specialists in other disciplines.

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Judith S. Mausner, M.D.
1924–1983

KATHARINE R. STURGIS

JUDITH S. MAUSNER, professor of epidemiology in the Department of Community and Preventive Medicine at the Medical College of Pennsylvania, died at age 59 on November 2, 1983, in Munich, Germany. She came to Philadelphia in 1962 when her husband, Dr. Bernard Mausner, became chairman of the Department of Psychology at Beaver College. I remember her sweet simplicity when she appeared in my office to inquire into the possibility of an appointment in my department. The couple had two daughters—Rachel and Sarah—and there had never been a question about the unity of the family in the move to Philadelphia.

Dr. Mausner graduated from Queens College in 1944, from New York Medical College in 1948, and while she was assistant professor of epidemiology in the Graduate School of Public Health at the University of Pittsburgh, she received her M.P.H. from that institution.

Judith was certified in general preventive medicine. She followed not only the letter but the spirit of the law—compassionate, understanding, but firm. She served on the Committee on Preventive Medicine of this College, of which she became a Fellow in 1968. She also served on the National Board of Medical Examiners Preventive Medicine and Public Health Test Committee, having been its chairman from 1980 to 1981. She was a member of the Technical Panel on Environmental Hazards of the American Public Health Association as well as a member of many other committees, including the Breast Cancer Task Force of the American Cancer Society and the National Cancer Institute. Among her research studies were those on smoking habits among physicians and medical students, suicide by physicians, and, most recently, hypertension in infants.

Shortly before her death, Judith finished the second edition of her textbook, *Epidemiology, an Introductory Text.*

Dr. Sturgis is Professor Emeritus of Preventive Medicine at the Medical College of Philadelphia and former President of The College of Physicians of Philadelphia.

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Despite knowing of the hopeless prognosis of the brain tumor from which she died, Judith carried on with her teaching through the spring of 1983 and accompanied her husband to Munich while he worked during his sabbatical year. A woman of quiet determination, Judith had standards that were lofty; her loyalties were strong, and she continued forward with good cheer so long as life permitted it—an example for those of us who had the privilege of associating with her.

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Philadelphia, PA 19128

Alexander Rush
1910–1983

JOSEPH B. VANDER VEER

ALEXANDER RUSH, a Fellow of the College for thirty-six years, died on October 24, 1983, a few days before his seventy-third birthday. Sandy, as he was known to his many friends and colleagues, was a direct descendant of Benjamin Rush, signer of the Declaration of Independence and one of the founders of The College of Physicians of Philadelphia. Sandy was born in Philadelphia and attended St. Paul's School and Princeton University. He received his M.D. degree from the University of Pennsylvania in 1936 and was an intern at the Pennsylvania Hospital during the next two years. This was followed by a year's fellowship in pathology at the same hospital and a two-year fellowship in gastroenterology at the University of Chicago. With Robert F. Norris he received the first Thomas McCrea Award of the Pennsylvania Hospital for publication of original research. It was presented by Henry A. Christian, professor of medicine at Harvard.

Sandy Rush had an outstanding military record in World War II. He was a member of the Pennsylvania Hospital Unit (originally the 52nd Evacuation Hospital), the first hospital to sail for overseas duty. He served on several South Pacific Islands from January, 1942, to March, 1945, and was successively executive officer, assistant chief, and chief of the medical service in what was then a 1200-bed station hospital in New Guinea. Earlier, while stationed on Marua (Woodlark) Island, he volunteered on a Navy mission attempting to rescue three downed Australian fliers, on a rubber raft, just below the large Japanese airbase at Rabaul. Such rescue missions were usually attempted with PBY flying boats, but the sea was too rough for them to land and P-T boats were used instead. The mission was unsuccessful, but Sandy said he learned one thing—he could get seasick! He returned to the United States in March of 1945 and was appointed gastroenterologist of the Rhoads General Hospital, where he held the rank of Major A.U.S.

Dr. Vander Veer is Professor of Clinical Medicine (Emeritus) at the University of Pennsylvania Medical School.

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At the end of World War II Sandy returned to the Pennsylvania Hospital, and he was associated with this institution and the University of Pennsylvania Medical School during the rest of his life. He rose from instructor in medicine to associate professor of clinical medicine, and he was an associate in gastroenterology at the University of Pennsylvania Graduate School of Medicine. He was physician to the Pennsylvania Hospital and chief of the Department of Gastroenterology from 1955 to 1974. He was president of the medical staff of the Pennsylvania Hospital from 1972 to 1976 and consultant in medicine from 1976 onward. He was associated with the Benjamin Franklin Clinic for many years as the gastroenterologist, and he was its medical director from 1971 to 1977. In this capacity he continued to see patients, and his medical examinations and reports were renowned for their thoroughness. He was a member of the medical staffs of the Bryn Mawr Hospital, the Fox Chase Cancer Center, and the American Oncologic Hospital. At various times he was associated with the health programs of the Corn Exchange Bank; Morris, Wheeler, and Company; and The Provident National Bank. Sandy had a happy association with the First City Troop of Philadelphia and was troop surgeon, following World War II until his death, of the Philadelphia City Cavalry. He was certified by the American Board of Internal Medicine and the Specialty Board of Gastroenterology.

Sandy was a great lover of the out-of-doors and was especially fond of sailing, in which he was an expert. He was familiar with the coast of Maine, one of his favorite places, and with many of the Caribbean Islands. He had sailed off the coasts of Sweden and Alaska and in the Baltic, often as his own captain.

During his lifetime Sandy had a number of serious illnesses. On regaining his health, he quickly returned to his previous duties and activities. His final illness was an example of his strength and imperturbability: when he learned he had an acute leukemia, in which the prognosis was bad and the outlook for survival only a few months, he decided against any therapy which would impair his ability to continue to work, despite the fact it might prolong his life a bit. He continued to see patients even though he was often uncomfortable from hemorrhagic complications. The end came mercifully and quickly from a cerebral hemorrhage.

Sandy had many important non-medical associations. At various times he was a member of the board of trustees of the Rush Hospital and

the Southern Home for Children. He was a trustee of the Mutual Assurance (Green Tree) Insurance Company of Philadelphia, the Library Company of Philadelphia, and Dickinson College. He was a member of The Medical Club, The Philadelphia Club, and a parishioner of St. David's Church in Wayne. He was also the author of numerous journal articles and chapters in two textbooks, all in the field of gastroenterology.

Sandy married Carol Smith in 1945 and they were blessed by two daughters and three grandchildren. Sandy was an outgoing person and a loyal friend. He had a host of friends in the medical profession and throughout this area. He will be greatly missed by his friends and by the many organizations and institutions in which his wise counsel was greatly valued.

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ACADEMIA

Items of Interest from Philadelphia Medical Centers

Hahnemann University. On March 8–10 the student chapter of the American Medical Women's Association sponsored a series of workshops on the topic, "Equity and Humanity in the Workplace: Can Women Make a Difference?" Speakers included *Dr. Ilda Ficher,* Professor of Mental Health Sciences.

Under the direction of *E. Frederick Wheelock, M.D., Ph.D.,* Professor of Pathology and Laboratory Medicine, a curriculum has been established in the graduate school for the training of clinical immunology. Its graduates will be certified as immunology technologists.

On February 26 at an academic convocation, *Linus C. Pauling, Ph.D.,* was awarded an honorary Doctor of Science degree. Dr. Pauling is twice a Nobel laureate, winning prizes in chemistry in 1954 and the peace prize in 1962.

Israel Zwerling, M.D., Professor and Chairman, Department of Mental Health, and an authority in family therapy, has been elected to the Board of Trustees.

A three-year study is underway, in collaboration with nine other hospitals, to predict and prevent sudden cardiac death through TEST, an acronym for three drugs (Timolol, Encainide, Sotalol Trial). The principal investigator is *Joel Morganroth, M.D.,* Professor of Medicine and Director, Sudden Death Program.

The National Institutes of Health has awarded a three-year grant to *Akhil B. Vaida, Ph.D.,* for research on the causes of breast cancer.

Thomas Jefferson University. *Warren R. Lang, M.D.,* Professor of Obstetrics and Gynecology and medical director of the Department of Cytotechnology, has been named the first Gonzalo E. Aponte Professor of Pathology. Dr. Lang is a 1943 graduate of Jefferson Medical College.

Edward H. McGehee, M.D., a member of the class of 1945 at Jefferson Medical College, has been appointed the first Ellen M. and Dale W. Garber Professor of Family Medicine.

A third new chair, the Rorer Professorship of Medicine, has been established and awaits an occupant to be named presently.

The American College of Surgeons has appointed *Gerald J. Marks, M.D.,* to its Board of Governors.

The appointment has been announced of *Daniel Lieberman, M.D.,* to the post of acting chairman of the Department of Psychiatry and Human Behavior.

One possible clue to the pathogenesis of AIDS has come to light through the research of *Stephen P. Hauptman, D.O.,* Associate Professor of Medicine. Some white blood cells, it has been discovered, carry a genetic defect on their surface that impairs their defense against invading organisms.

James Erskine, M.D., has been appointed professor of medicine and director of the Division of Pulmonary Diseases.

A former acting dean, *Richard H. Schwartz, M.D.,* has been named dean of

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the College of Medicine at State University of New York, Downstate Medical Center, and vice-president for academic affairs.

Michael J. Mastrangelo, M.D., has been appointed director of the Division of Oncology and professor of medicine.

The Medical College of Pennsylvania. A team headed by *Alan S. Bellack, Ph.D.,* Professor of Psychiatry and Psychology, will investigate the possible roles of anger and hostility in hypertension. Their work is funded by a grant from the National Heart, Lung and Blood Institute.

A Panic Disorder Clinic has been established under the directorship of *Edmond H. Pi, M.D.,* Associate Professor of Psychiatry.

A workshop titled "Advancement for Women in Academic Medicine" was held at the Barclay Hotel on May 9, 10, and 11 to provide female physicians with the information and skills necessary to advance up the academic ladder. Seminars were led by *Kathleen Turner* of the Association of American Medical Colleges, *Marcia Angell, M.D.,* deputy editor of the *New England Journal of Medicine,* and *Judith Lorber, Ph.D.,* of City University of New York. Keynote speaker was *Rosalyn S. Yalow, Ph.D.,* Nobel Laureate and senior medical investigator, Veterans Administration Medical Center, Bronx.

On March 17 ground was broken for a $36 million patient care pavilion that will begin operation in 1986. The building will contain new beds, an expanded intensive care facility, accommodations for pediatric patients, an emergency unit, and teaching space.

A contract has been signed with a management corporation to reduce the center's energy consumption more than 20 percent annually over a ten-year period at an estimated savings of approximately $2.3 million.

Lila Stein Kroser, M.D., a specialist in family medicine, has been appointed to the Board of Corporators.

Funded by a grant from the National Institutes of Health, a research project on genetic regulation of nerve cell growth is underway and is directed by *Pat Levitt, Ph.D.,* assistant professor of anatomy.

A summary of marine distempers and misadventures, *Dr. Cohen's Healthy Sailor Book,* has been published. The author, *Michael Martin Cohen, M.D.,* is assistant professor of neurology.

University of Pennsylvania School of Medicine. The 1984 Passano Foundation Award has been given to *Peter C. Nowell, M.D.,* Professor of Pathology, in recognition of his contributions to cancer research. Dr. Nowell and Dr. David Hungerford discovered the Philadelphia chromosome, an abnormality of cancer cells consistently noted in chronic myelogenous leukemia. The discovery has provided valuable new clues as to the nature of malignant disease. A portrait of Dr. Nowell, formerly chairman of the Department of Pathology and later director of the University of Pennsylvania Cancer

Center, was recently presented to its school of medicine.

Three first-year students have organized and taught an elective course in computer programming for their classmates. Fifty-five attended lectures and many made use of leased computer terminals.

A Council of Education in Family Medicine has been established to acquaint students with the nature and goals of family practice. Its membership is drawn from affiliated hospitals in Pennsylvania and New Jersey.

Leonard A. Bruno, M.D., Assistant Professor of Neurosurgery and a graduate of The College of Physicians and Surgeons of Columbia University, has been named the first Sandie Altman Scholar for Brain Tumor Research.

Gail Morrison, M.D., has been appointed chairperson of the Committee on Admissions.

Effective February 1, 1984, *Peter C. Whybrow, M.B., B.S. (London),* was appointed professor and chairman of the Department of Psychiatry. Dr. Whybrow, a graduate of University College, London, and its medical school, is a fellow of the American College of Psychiatrists and a member of the Royal College of Surgeons, London. He served most recently as professor of psychiatry at Dartmouth Medical School, where his research investigations were focussed on thyroid hormone and catecholamine interactions in the central nervous system.

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of

THE COLLEGE OF PHYSICIANS
OF PHILADELPHIA

MEDICINE & HISTORY

Series V Volume VI N° 3 September 1984

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Authors should submit two copies, typed on one side of 8½ by 11 inch paper; all material, including quotations and references, should be double-spaced. A short summary of the paper should also be included. *Transactions & Studies* accepts either footnotes or references, but either must be in accordance with the guidelines in *A Manual of Style* (Chicago: University of Chicago Press, 1969), 12th edition. Prospective authors are encouraged to examine back issues of *Transactions & Studies* to familiarize themselves with the format of the journal.

Photographs and other illustrations may be included. Tables must be typewritten on separate sheets; they should be prepared professionally before submission.

Please address any queries concerning the format of *Transactions & Studies* to Linda E. Mills, Assistant Editor.

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TRANSACTIONS & STUDIES
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The Nature and Timing of Sleep

DAVID F. DINGES

SUMMARY: Sleep is highly sensitive to our waking lives and capable of affecting how we feel and perform during wakefulness. While the functions of sleep have yet to be fully elucidated, in the last two decades research has uncovered the subtle complexity of its structure and timing. Enormous strides have been made in understanding normal and abnormal sleep. There are currently few areas of clinical medicine that are not undergoing some revision based upon what we have learned about sleep.

SLEEP research and advances in the clinical assessment and treatment of sleep disorders have exploded in the past 23 years since the first formal meeting of sleep scientists. Until the early 1960s there were 4,000 to 5,000 references relevant to sleep in the entire scientific literature.[1] Since the mid-1970s, however, sleep research citations have averaged 1,500 to 2,000 per year![2] Not surprisingly, the result has been an exponential growth in knowledge about sleep. Investigators have recorded the physiological changes that occur in sleep and that involve not only the central nervous system but also cardiopulmonary, gastroesophageal, endocrinological, and thermoregulatory systems. The temporal controls for sleep and some of the neural mechanisms underlying these biological clocks have begun to be uncovered. Perhaps most importantly, sleep disorders heretofore unknown, some of which are life-threatening, have been discovered. The gains have been considerable, but we have yet to answer fully the most basic question: Why do so many animals, ourselves included, sleep?

The Function of Sleep

Sleep is such an integral part of our lives (taking up nearly a third of our existence), that to inquire about its function is considered by many to be a naive question. This is largely because the answer seems

Dr. Dinges is Co-Director of the Unit for Experimental Psychiatry, The Institute of Pennsylvania Hospital, and Clinical Assistant Professor of Psychology in Psychiatry, University of Pennsylvania Medical School, Philadelphia. This paper was the Nathan Lewis Hatfield lecture given at College Night, April 4, 1984.

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obvious; sleep is for feeling rested, for recuperating. Imagine then the frustration and veiled embarrassment of a sleep scientist who must announce that this "obvious" answer has been surprisingly difficult to document and may yet prove to be at best only partially correct.

At the broadest level one can attempt to determine the function of sleep by examining its evolutionary or phylogenetic changes. Such analysis indicates that virtually all mammals, most birds, and, indeed, all warm-blooded (i.e., homeothermic) animals sleep, but it becomes increasingly more difficult to recognize the presence of sleep as one moves down the vertebrate scale to cold-blooded (i.e., poikilothermic) animals like reptiles and fish.[3] Thus, it is assumed that sleep, as we define it, is a relatively recent adaptation.

Among mammals the structure, length, and type of sleep seem to depend upon both organismic variables like metabolic rate,[4] and ethological factors like predation.[5] For example, shorter, more fragmented sleep periods are found in herbivores such as antelopes and rabbits, while the longest sleep period is found in the primates and in carnivores such as bears and big cats, which have no natural enemies apart from man. In general, the more vulnerable an animal is to being eaten, the shorter its sleep period and the less time it spends in rapid eye movement (REM) or paradoxical sleep—a state that is associated with lowered responsiveness to the environment. Slow-wave sleep (SWS or delta sleep), on the other hand, is inversely related to body size and positively associated with metabolic rate in mammals.

While sleep varies greatly among mammalian species not only in amount but also in kind (e.g., dozing, paradoxical sleep, SWS, hibernation), there is considerable consistency in the nature and timing of sleep within a given species, and so we might direct our question about the function of sleep toward ourselves and ask: Why do humans sleep? There are numerous theories about sleep; some emphasize body or brain restitution, others posit an information-processing function, still others stress instinctive, adaptive, and ethological functions.[6] Sleep in humans may well fulfill a number of these purposes—the theories are not mutually exclusive but differ only in emphasis.

Whatever it is that sleep does for us should at least be partially answered by observing what happens when we are denied sleep. This is a common approach to assessing the biological or survival function of an activity or physiological state. For example, if one withholds food or water, animals die. Can the same be said of sleep? Apparently, "yes" for rats[7] but possibly "no" for humans.

Although the first human sleep deprivation study was conducted before the turn of the century,[8] the father of sleep research, Nathaniel Kleitman, did the first extensive human sleep deprivation studies in the early 1920s.[9] Much work followed this and consistently showed that healthy humans could undergo sleep loss for as long as 11 consecutive days (which is about the longest it has been studied) without serious medical complications.[10–12] It is unknown how long humans can go without sleep before medical complications might emerge; people do not readily volunteer for prolonged sleep deprivation experiments because sleep loss is profoundly unpleasant. It has other consequences as well.

By as early as the second night without sleep, a subject shows changes in behavior, including withdrawal, periodic complaints and disorientation, and most importantly, overwhelming sleep attacks.[13,14] The pressure builds until sleep intrudes into wakefulness, causing lapses, which are due to microsleeps—brief (often only a few seconds) involuntary onsets of stage 1 sleep.[15,16] This is especially true when the subject is in an unstimulating environment, so any activity requiring self-sustained attention, like driving a car, becomes impossible to do and to remain awake. Furthermore, subjects literally cannot remain awake if forced to stay in bed and rest but not sleep. Bedrest, therefore, does not substitute for sleep, and this suggests that sleep does not function simply to provide passivity or lethargy.

Thus, whatever its function, sleep cannot be completely denied; waking alertness cannot be maintained without it, and it is not simply passive rest. Beyond this, we now also know that sleep is not just one condition or state but rather an exquisitely timed alternation of vastly different biobehavioral states, suggesting that the function(s) of sleep may depend upon its very structure.

The Structure of Sleep

The age-old notion that human sleep was a passive, unitary, quiescent state was swept away with the advent of human brain-wave recordings by scalp electroencephalography (EEG), first reported by a German neuropsychiatrist, Hans Berger, in 1929.[17] By 1934 the report had been confirmed by Adrian and Matthews in England,[18] and within a year of that, a group of scientists at Harvard reported that the EEG changed systematically as a subject went to sleep and as sleep continued.[19]

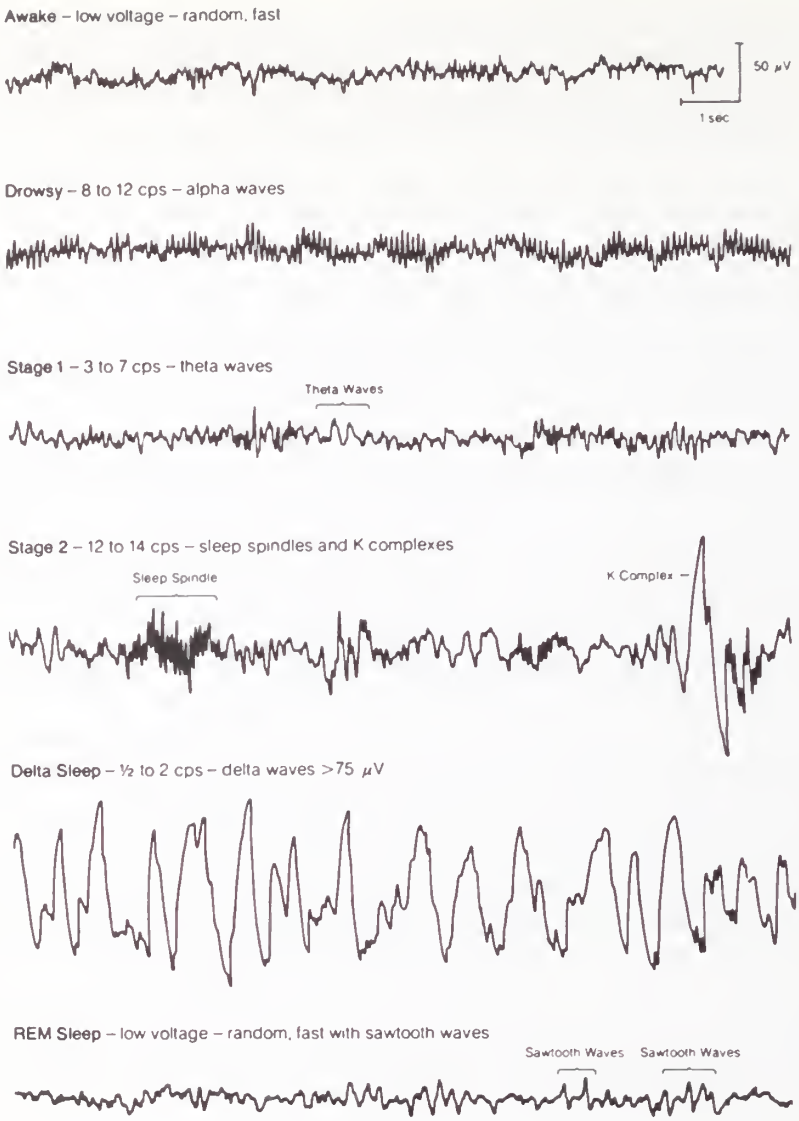

Figure 1. Human electroencephalographic recordings of sleep stages. (From P. Hauri, The Sleep Disorders. In *Current Concepts*, K. M. Mann, ed. Kalamazoo, Mich.: Scope Publication, Upjohn, 1982, p. 7, by permission.)

These changes were so dramatic that this group offered the first, and still generally accepted, scoring system for sleep stages. It was this discovery that made it clear that sleep could never again be considered either a passive or a unitary state.

The changes in the human EEG during sleep comprise the heart of the now standardized sleep stage scoring system (Figure 1).[20] There are systematic changes in the predominant frequency and in the amplitude of low frequency delta waves (0.5-2 cps) as normal sleep progresses from drowsiness to SWS or delta sleep (i.e., through *non*-REM sleep). Following this progression into non-REM sleep, the brain displays an activated EEG that looks somewhat similar to the EEG of an awake subject, although the person is asleep: hence its name, paradoxical sleep.

Paradoxical sleep came to be known as rapid eye movement (REM) sleep after a series of crucial scientific discoveries in Kleitman's laboratory at the University of Chicago in the mid-1950s. They found that not only was the brain's activity varied during sleep, but the eyes displayed slow, rolling movements at sleep onset and rapid, jerky movements at various times when the sleeper's EEG appeared activated.[21] In addition, and to nearly everyone's amazement, when a sleeper was awakened during these periods of rapid eye movements and wake-like EEG, the subject would typically report having experienced a dream.[22] Progress was rapid after these discoveries, and for the next decade researchers documented a host of fundamental physiological and behavioral differences between REM and non-REM sleep stages.

Nearly every organ system studied showed striking differences in response to REM and "deep," non-REM, SWS (i.e., stages 3 and 4 sleep; see Table 1). During REM sleep the brain not only appears electrically active, but cerebral blood flow, oxygen consumption, and basal temperature are all increased relative to SWS, when these functions are at their lowest. Respiration and heart rate are increased and variable during REM sleep; they are slow and steady in SWS. Muscles are inhibited or paralyzed in REM except for minute, brief muscular movements of the outer extremities; these are tonic and quiescent in SWS. During REM sleep body temperature varies with the environment—the organism becomes poikilothermic—while in non-REM the sleeper is once again homeothermic. In REM sleep dreams are frequent and vivid; in SWS they are infrequent, vague, and, if a subject is awakened, he will report that he is thinking, not dreaming. Penile or

clitoral tumescence occurs during REM but not SWS. Clearly, the basic physiology of the organism changes profoundly from one sleep stage to the next.

Slow wave sleep seems to be the "deep," restorative, homeostatic sleep we all seek, while REM sleep is characterized by intense autonomic and central nervous system activity, vivid dreams, and muscle paralysis that apparently prevents us from acting out our dreams. Certainly such broad biobehavioral differences between SWS and REM suggest radically

Table 1

Differences Between
Rapid Eye Movement (REM) and Slow Wave Sleep (SWS)

Factors Concerning Sleep	REM Sleep	SWS (Stages 3 & 4)
Brain:		
Electroencephalogram	low-voltage-fast	high-voltage-slow
Cerebral blood flow	high	low
Oxygen consumption	high	low
Temperature	high	low
Body:		
Eyes	rapid movements	no movements
Pupils	dilated	normal
Heart Rate	increased & variable	slow & steady
Respiration	increased & variable	slow & steady
Musculature	inhibited	tonic
Sex organ	tumescent	flaccid
Temperature control	poikilothermic	homeothermic
Behavior:		
Movements	occasional twitches	none
Dream reports	frequent & vivid	infrequent & vague
Deprivation	agitated & impulsive	withdrawn & physical complaints
Occurrence:		
Phylogenetically	more primitive	less primitive
Ontogenetically	decreases	increases/decreases
Stability across nights	low correlation	high correlation
In normal sleep cycle	latter half of night	first half of night
In time-free environment	temperature-cycle dependent	sleep-dependent
Abnormal manifestations: (examples)	narcolepsy chronic alcohol use endogenous depression	enuresis sleep terrors sleepwalking

different functions for these sleep stages. Deprivation of either one, however, does not produce any striking changes (though there are subtle differences) beyond making us look drowsy. In the early 1960s it was thought that REM deprivation might produce psychosis in otherwise normal individuals. It does not.

The pattern of measureable changes in brain and body physiology that occurs for either REM or non-REM sleep is easily identified in a human subject, regardless of gender, ethnic group, occupation, or level of physical fitness. These patterns form the basis of modern clinical polysomnographic monitoring and sleep stage scoring.[23] Although sleep length and sleep stages are relatively stable in humans, they change systematically during the course of development, especially during the first few months and years of life.

As any new parent can attest, the pattern of a baby's sleep changes most dramatically during the neonatal period, up to 3 months of age.[24] REM sleep occupies nearly 50% of the newborn human's average daily sleep total of 17 hours, but its proportion of total sleep time decreases to about 25% during the first 3 years of life. At this age, total sleep time is decreasing to an average of 12 hours a day and becoming increasingly consolidated into the nocturnal period. Conversely, non-REM sleep, especially SWS, increases its proportion of total sleep time during infancy. These changes are highly reliable during this time, and one can actually determine with reasonable accuracy the gestational age and, to some extent, the neurological integrity of a neonate from its sleep record.[25]

Changes in total sleep time and amounts of REM and non-REM sleep are most marked up to puberty, but continue for all of us throughout our lives (Figure 2). Total sleep time is fairly stable in adulthood but seems to decrease in later years. Even in otherwise healthy adults, from about age 35 on and, in particular, beyond the age of 60, sleep time declines gradually while time awake in bed and variability in sleep quality and quantity increase.

The entire question of sleep's relationship to aging is currently the topic of considerable debate. Sleep complaints are very common among the elderly, and a disproportionately high percentage of hypnotic medication prescribed annually in this country for sleep complaints goes to this group; a recent National Academy of Sciences Institute of Medicine report on sleeping pills, insomnia, and medical practice revealed that 39% of all hypnotics prescribed in 1977 were for persons

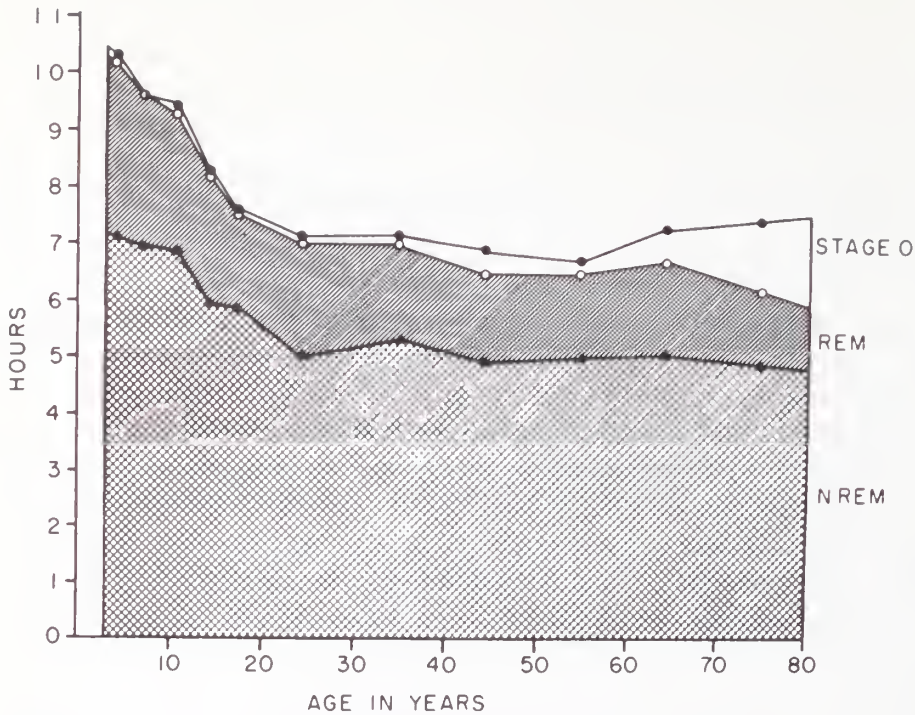

Figure 2. Average total amount of nocturnal sleep in terms of REM, non-REM, and stage 0 (wakefulness), for males from ages 3 to 79. (From R. L. Williams, I. Karacan, and C. J. Hursch, *Electroencephalography (EEG) of Human Sleep: Clinical Applications.* New York: John Wiley & Sons, 1974, p. 91, by permission.)

over 60 years of age, yet this group constitutes about 15% of the population and only 11% of all patients making office visits.[26] Older persons' complaints about sleep are not without foundation, however. Beyond the age of 50 to 60 years, both REM and non-REM sleep decrease, SWS diminishes dramatically in amplitude, and sleep is generally less deep, more easily interrupted, labile, and fragmented, especially in males, though elderly females are more likely to report a sleep disturbance.[27–31]

But these changes do not occur consistently in all elderly people, and investigators are currently considering that certain mechanisms (e.g., sleep apnea) account for some of the more serious alterations of sleep in older adults. The debate centers on whether the changes in sleep in late adulthood are inevitable consequences of ontogeny, or whether they

reflect an increased susceptibility to sleep disorders. In either case, the important problem is what, if anything, can or should be done to identify and treat these complaints.

The amount of sleep and the proportion of sleep stages are not the only aspects of sleep structure relevant to its function, development, and pathology. Along with the discovery of dramatically different sleep stages and their changes in the course of the human life span came the observation that their timing during sleep was also systematic across individuals (Figure 3).[22] Delta sleep (i.e., SWS) typically occurs early in the night and alternates with REM sleep, which is concentrated in longer periods toward the latter half of the night. Stage 2 non-REM sleep occupies about half of the total sleep time throughout the night and serves as a buffer between REM sleep and SWS. Brief awakenings or arousals normally occur two to four times a night, while changes in body posture occur an average of eight to nine times a night, at the transitions between REM and non-REM sleep.[32]

The constantly cycling pattern of non-REM and REM sleep stages appears to be an endogenous biological rhythm with a period (i.e., repeating frequency) of approximately 90 to 100 minutes. Kleitman considered it the Basic Rest Activity Cycle (BRAC),[1] and some investigators have concluded that it manifests itself in altered body

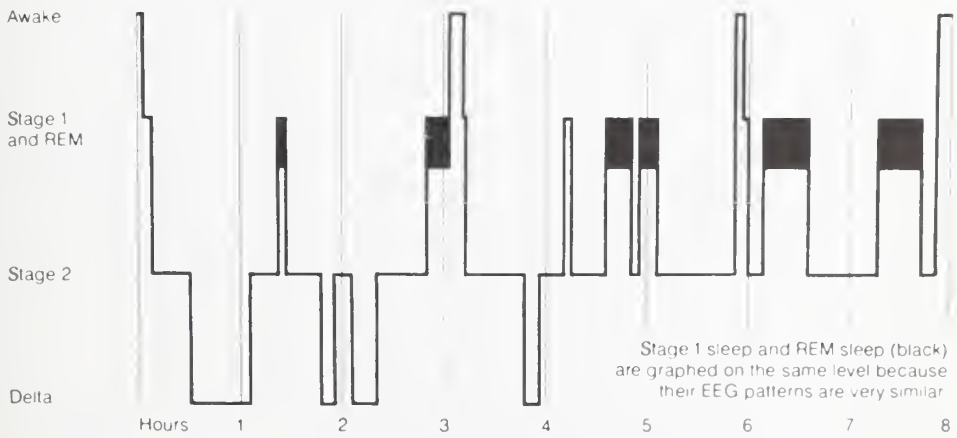

Figure 3. Typical nocturnal sleep pattern of a young human adult. Stage 1 sleep and REM sleep (black) are graphed on the same level because their EEG patterns are very similar. (From P. Hauri, The Sleep Disorders. In *Current Concepts*, K. M. Mann, ed. Kalamazoo, Mich.: Scope Publication, Upjohn, 1982, p. 8, by permission.)

chemistry and thought during wakefulness as well as sleep.[33] A neurophysiological basis for the cycle of non-REM and REM sleep has been advanced,[34] but the precise nature and function of this intra-sleep oscillation remains unclear.

What is known about this cycle is that for reasons not yet understood, the latency of REM after sleep onset appears to be an extraordinarily sensitive marker of certain abnormalities. For example, the occurrence of REM at sleep onset can indicate narcolepsy, a serious sleep disorder of the central nervous system.[35] When SWS and REM sleep are suppressed and the latency to REM is delayed, chronic alcohol abuse may be the cause.[36] Finally, and perhaps most exciting of all, early REM latency can be diagnostic of endogenous depression,[37] a severe psychiatric disorder. In experimental studies, REM deprivation has been shown in some measure to relieve this depression.[38]

The Timing of Sleep

The timing and amount of REM sleep in a given period also varies depending on where that interval occurs in a 24-hour day. Sleep and wakefulness alternate with each other on a *circadian* basis, that is, they undergo one full cycle in about a day, the 24 hours it takes the earth to rotate once on its axis, one light–dark cycle. Thus, sleep–wakefulness oscillations (and most biological functions, for that matter) seem to reflect a basic bio-rhythmicity—indeed, biological rhythms are the rule in nature rather than the exception, with periodicities shorter than 24 hours (ultradian), about 24 hours (circadian), or longer than 24 hours (infradian). From the activity of single cells to the cycling of the seasons, from the simplest to the most complex organism, biological rhythms regulate life cycles.[39] They are the purview of chronobiology; human chronobiology as a scientific discipline developed simultaneously with and independently of modern sleep research. Cross-fertilization between the two fields has provided some of the more dramatic recent breakthroughs in our understanding of the control of the timing of human sleep.

Sleep for humans commonly occurs at night (we are diurnal rather than nocturnal animals), though increasingly more of us are engaged in shift work, where the sleep cycle is often reversed (i.e., sleep by day and work by night). In industrialized countries the number of part- or full-time night workers has been steadily increasing, with current estimates

ranging from 13% to 23% of the workforce.[40] For most of us, however, when daytime sleep does occur it takes the form of a nap in the mid-afternoon,[41] a period comparable to the siesta of other cultures.

In terms of the timing of sleep, the basic question posed by sleep researchers has been: To what extent is the occurrence of sleep at night a function of an endogenous biological clock rather than a function of external factors like darkness? The answer is far from obvious for the sleep of *homo sapiens,* at least. (Thomas Edison, for example, believed that it might be possible to eliminate or reduce the need for sleep by providing artificial light, and the increase in night work and round-the-clock operations in modern society often ignores even the possibility of biological limits on human functioning at certain phases of the 24-hour day.) To answer the question scientists focused on basic oscillatory processes of the body during sleep deprivation and in time-free environments.

One of the earliest observations in the study of sleep deprivation was that the body's 24-hour temperature cycle continued to oscillate during sleep loss, though its range or amplitude of oscillation was diminished with each successive day without sleep.[9] In a human who experiences nocturnal sleep, oral and rectal temperatures oscillate about 1° C every 24 hours (Figure 4). *Onset* of nocturnal sleep (downward arrow) regularly occurs as body temperature falls to a low; the temperature nadir occurs in mid-sleep (gray bar in section I). *Offset* of nocturnal sleep (upward arrow) occurs as temperature rises in the morning (section II). Naps begin and end close to each other on the temperature plateau (section III). If we do not sleep at all, this temperature rhythm continues, and we have greater trouble functioning effectively and remaining awake at the low ebb of the temperature cycle. Does this mean that temperature oscillations control sleep–wakefulness alternations?

To answer this question, sleep researchers and chronobiologists placed individuals in time-free environments (i.e., no clocks, no windows, nothing to tell the person the time of day) and allowed them to work, eat, and sleep when they chose to. Subjects lived in these environments for a month or more. The original subjects were the scientists themselves, living deep in caves. (There is a kind of poetic irony here: man having to return to the cave to understand sleep.)

By the mid-1960s there were, worldwide, only a few sophisticated time-isolation chambers for continuously monitoring biological cycles;

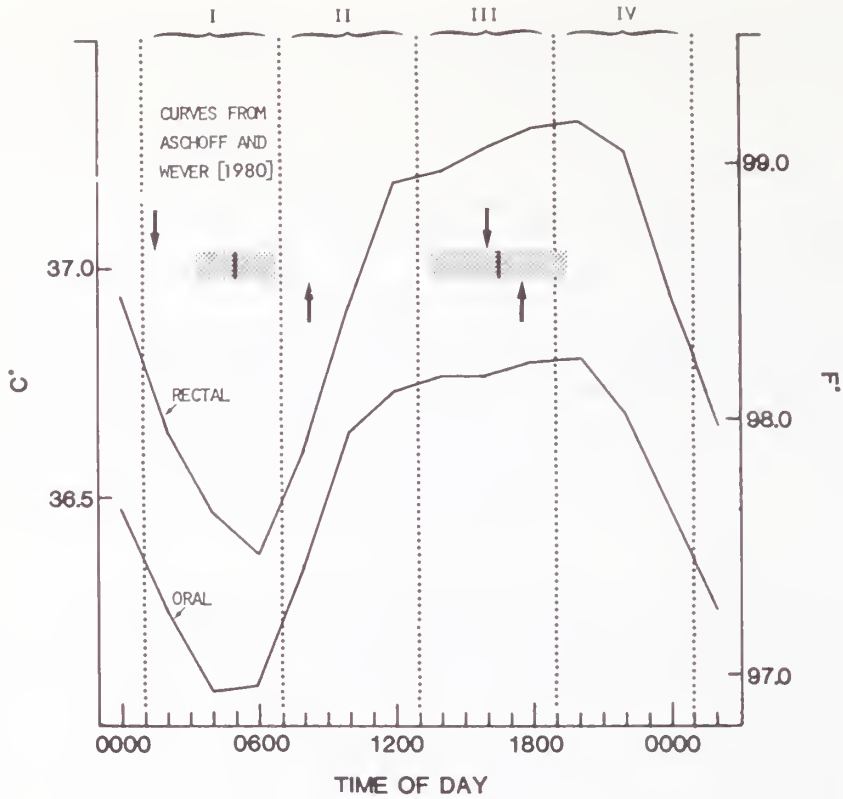

Figure 4. Characteristic 24-hour curve of rectal and oral temperatures. Downward arrows indicate the most common time for healthy young adults to begin sleep at night (quandrant I) and when napping (quadrant III). Upward arrows indicate the most common time for awakening after nocturnal sleep (quadrant II) and after naps (quadrant III). Shaded bars represent mid-nocturnal (quadrant I) and mid-nap (quadrant III) sleep times. (Curves from J. Aschoff, Circadian rhythms: Interference with and dependence on work-rest schedules. In *Biological Rhythms, Sleep and Shiftwork*, L. C. Johnson, D. I. Tepas, W. P. Colquhoun, and M. J. Colligan, eds., . Jamaica, N. Y.: Spectrum Publications, 1981, p. 12, by permission.)

it was at this time that Jurgen Aschoff and his colleagues at the Max-Planck-Institut für Verhaltensphysiologie in West Germany reported an astonishing discovery, which they named spontaneous "internal desynchronization."[42,43] Perhaps the easiest way to illustrate what they observed is to look at a very simplified and idealized plot of sleep–wakefulness oscillations in a time-free environment (Figure 5).

There are a number of important points made in this illustration: First, in "entraining" environments—those in which time cues are present (top of graph)—sleep and wakefulness oscillate through one full cycle in 24 hours. That is, the sleep–wake period is equal to the *zeitgeber* (time-giver) period, both of which are 24 hours. The common entraining *zeitgeber* is the light–dark cycle. In this illustration, an individual goes to sleep around midnight (24 hours) and awakens around 8 AM. The peak in the temperature cycle (left dot) occurs during the awake phase and

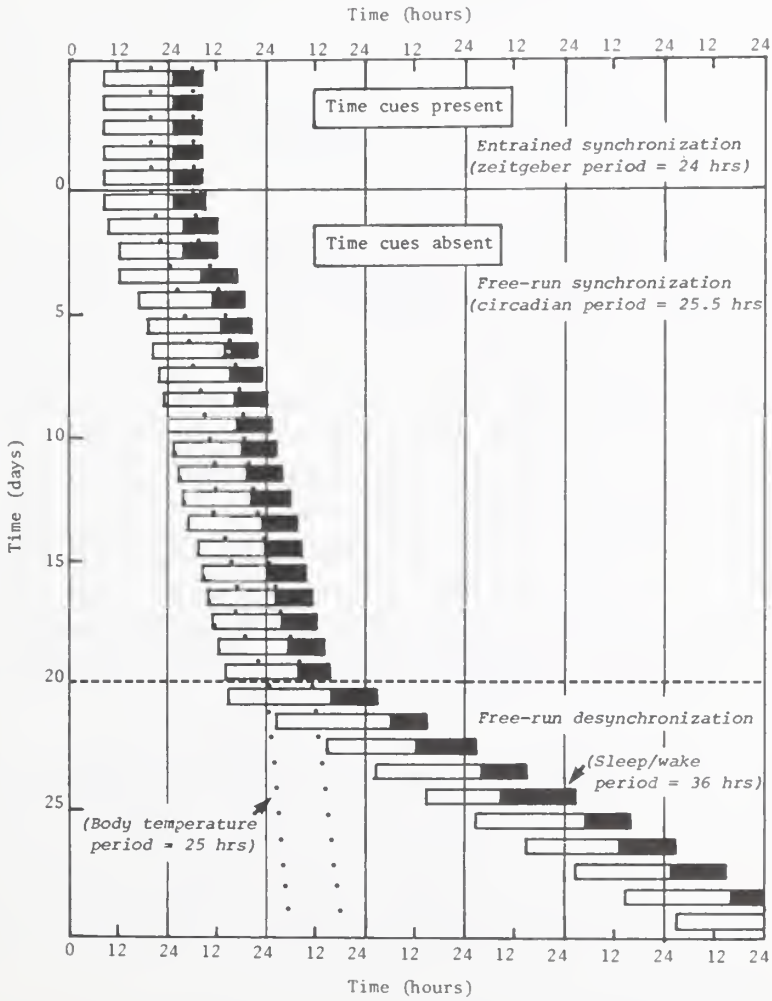

Figure 5. An example of changes in sleep–wakefulness oscillations and temperature rhythm in a time-free environment.

the temperature nadir (right dot) occurs during the nocturnal sleep phase. The person remains more or less entrained to the light–dark cycle of the planet.

A second observation is that when time cues are removed (middle of graph) and the person is no longer exposed to an entraining *zeitgeber* (e.g., the planetary light–dark cycle), sleep–wakefulness oscillations appear to run freely with a period in excess of 24 hours. The exact period of the cycle is closer to 25.5 hours instead of 24, and consequently, the subject loses one 24-hour day in approximately 16 cycles; onset of sleep drifts to a later and later time, circling the real-time clock. The ratio of sleep to wakefulness, however, remains about 1:2. This phenomenon is called "free-run" and it suggests that there is an internal (endogenous) biological clock controlling sleep–wakefulness oscillations. Could this regulator be the temperature cycle, since it remains coordinated to sleep–wakefulness during free-run? The answer to this question was Aschoff's discovery.

At some point far into the free-run period (bottom of graph) the individual's sleep–wake cycles typically take on a very long periodicity; that is, the sleep–wake biological "day" may be anywhere from 28 to 48 hours long! This is illustrated in Figure 5 by a 36-hour sleep–wake oscillatory period; the subject stays awake for 24 hours and then sleeps for 12 hours. The person is, however, unaware that his "days" are 1½ times their usual length. Body temperature, on the other hand, continues to run at a 25-hour periodicity. Thus, there is a kind of "internal desynchronization" between sleep–wake cycles and core temperature cycles. (The actual number of days in a time-free environment before desynchronization occurs, as well as the "new" period of the sleep–wake cycle, varies greatly among subjects, but it now appears that everyone eventually shows desynchronization with a long sleep–wake period if left long enough in time isolation.)

The implications of this are clear. There appear to be two endogenous clocks—one, for temperature oscillations, maintains a free-run periodicity of just over 24 hours; another, for sleep–wakefulness, has a much more variable and generally longer period. The temperature clock seems to be a stronger (less variable) oscillator because the cycle of sleep–wakefulness runs parallel to the temperature cycle for a long time early in the free-run condition.

Further study suggests neural and endocrinological bases for these clocks.[44] The sleep–wakefulness clock is located in the suprachiasmatic

nucleus of the anterior hypothalamus, astride the optic chiasm. Activity in this center, which is sensitive to retino-optic stimulation, apparently suppresses the release of melatonin by the pineal gland, the chief regulator of circadian endocrine activity.[45] The location of the stronger temperature-rhythm clock is unknown.

Finally, in the last few years investigators have shown that during desynchronization a basic relationship continues between body temperature and certain qualities of sleep.[46,47] Despite extremely long sleep–wake cycles, subjects awaken almost always on the rising side of the temperature cycle, just as they do in 24-hour timed environments. A propensity for REM sleep also occurs as a function of rising core temperature. The occurrence of sleep onset and SWS are not, however, reliably related to temperature.

Thus, sleep offset, total sleep time, and REM sleep are controlled biorhythmically by internal clocks, while sleep onset seems to have a different control and SWS appears to be a sleep-dependent process. Different endocrinological secretions are associated with each of these processes.[48] Not only is sleep a dynamic, multistage system, but there are multiple controls operating with more complexity than was ever assumed.

But why an internal sleep–wake clock? And why one with a period longer than 24 hours? There are enormous adaptive advantages for an organism that can anticipate internally important rhythmic changes in the environment, and therefore having an endogenous clock is clearly preferable to being constantly subjected to environmental serendipity. A period longer than the environmental cycle is also more adaptive than a slightly too-short period. It appears that biological systems can adjust better when their inherent period of oscillation is slightly longer than the environmental synchronizer.

This is illustrated in people who have a special type of disorder known as delayed sleep phase syndrome[49]—they cannot fall asleep until 3 or 4 o'clock in the morning. Attempting to advance their clocks backward to midnight is ineffective. But if these patients are placed in time-isolation chambers, and if each night they are put to bed 3 hours later than the previous night (i.e., if they delay their biological clocks), in 7 days they can be cycled around to falling asleep at midnight. This therapeutic application of chronobiology for delayed sleep phase patients can have beneficial effects lasting up to 6 months, at which time the clock usually needs resetting again.[49]

There are, however, practical consequences of an internally regulated sleep–wake system that are paramount when modern man attempts to ignore not only the need for sleep, but also its timing. Our bodily clocks for sleep and wakefulness do not adjust rapidly or well to radical changes in our environment, particularly changes brought on by placing our internal clocks in conflict with external ones. Shift work (especially night work) and jet lag are two common examples of this conflict. When our bodies and the environment are out of synchrony, we increase our chances of making mistakes, particularly if we are sleep-deprived or under stress. It is unfortunate that the near-miss accident at Three Mile Island and the fatal crash during the aborted Iranian rescue both occurred in the early hours of the morning, when biological clocks encourage sleep. These events might have been corrected more quickly, or perhaps even averted, had the participants not been subjected to the additional stress of performing at the circadian nadir.

Disordered Sleep

Even individuals who do not work in shifts or frequently fly across multiple time zones know what happens when they do not sleep well or long enough at night. Commonly the problem occurs when, for social reasons, we stay awake too late at night but have to get up at our regular time the next day. Alternatively, we retire on time but have to awaken earlier than usual to arrive at an appointment, drop the car off for repair, or perform some other mundane function. The result is the same—we get less sleep at night than we feel we need to function well and feel well the next day. Given the demands and stress of modern western culture, one might reasonably ask, as Webb has,[50] "Are we chronically sleep deprived?" The answer for many of us is "yes," especially during the week, when we sleep less than during the weekend.

While weekend sleep and daytime naps may help to replace lost sleep, all of us eventually suffer sleep loss or the feeling of disturbed or restless sleep for reasons that we do not *willfully* choose, such as when stress, anxiety, depression, and other factors interfere with our attempts to sleep. Who does not know the profound unpleasantness of lying in bed unable to fall asleep, or awakening repeatedly throughout the night, or awakening too early in the morning and not being able to return to sleep? Insomnia—inadequate or unsatisfactory sleep—ranks third, behind the common cold and headaches, as a reason for seeking professional help.[51]

But in the past twenty years sleep research has made tremendous gains in the clinical knowledge of sleep disorders. We reached a milestone in 1979 with the publication of the first symptom-based nosology of disorders of sleep and arousal.[52] In the same year the National Academy of Sciences Institute of Medicine published a report commissioned by the White House on sleeping pills, insomnia, and medical practice,[26] and Project Sleep, a national education program on insomnia and sleep disorders, was inaugurated by the U.S. Surgeon General.[53] All these programs and reports are directed at informing physicians of the rapid growth in knowledge of sleep disorders and their etiology, diagnosis, and treatment.

With this growth of knowledge there has also been an increase in the number of centers treating sleep disorders. The Association of Sleep Disorders Centers included only five member centers in 1975, when the organization was formed.[53] Current affiliation numbers 65—a growth of 60 centers in nine years—and there are approximately 200 unaffiliated centers nationwide, bringing the total to near 300. There are currently five excellent centers in the Philadelphia metropolitan area, with two to three more planned. In these centers polysomnography is used to screen for and detect individuals who suffer from chronic and severe sleep disorders. Some also serve to diagnose organically based sexual dysfunction through the monitoring of nocturnal penile tumescence.[54]

The nosology of disorders of sleep and arousal is based upon four groups within its classification system (Table 2).[52] The first group, disorders of initiating and maintaining sleep (DIMS), contains by far the most frequent sleep disorders, affecting between 14% and 35% of the general population. This class includes primary and secondary insomnias. The chief symptom is a patient's complaint of poor nocturnal sleep and/or daytime sleepiness. The patient does not, however, display excessive daytime sleepiness behavior, such as rapid or involuntary sleep onsets in the day, and this is what distinguishes the DIMS patient from the patient suffering from the next group of disorders.

Disorders of excessive sleepiness (DOES) are much less prevalent than DIMS, affecting less than 5% of the general population. They are, however, more insidious and more dangerous to an individual, because the presenting symptom is uncontrolled daytime sleep attacks that occur regardless of whether the patient is aware that his nocturnal sleep is disturbed or that he is drowsy during the day. The two most common examples of DOES are the sleep apnea syndromes (in particular,

Table 2

Symptom-based Classification of Sleep Disorders

Disorders of Initiating & Maintaining Sleep
(DIMS)

— 14% to 35% of the population
— Complaint of daytime sleepiness and/or poor night sleep
— No excessive daytime sleepiness
— Example: All insomnias (both primary sleep disorders and secondary to psychiatric disorders)

Disorders of Excessive Sleepiness
(DOES)

— 0.3% to 4% of the population
— Complaint of daytime sleepiness or fatigue
— Excessive daytime sleepiness (pathological onsets)
— Examples: Obstructive apnea, narcolepsy

Disorders of Sleep–Wake Schedule

— Example: Delayed Sleep Phase Syndrome

Parasomnias

— Examples: Sleepwalking, sleep terrors

obstructive apnea, which is usually found in males) and narcolepsy.[54] In the case of apnea, daytime sleep attacks are the result of chronic sleep deprivation and occur because the individual is prevented from normal nocturnal sleep by repeated arousals, of which the patient may often not be aware. The arousals from sleep can occur hundreds of times a night because the patient ceases to breathe or ceases to breathe normally during sleep. This disorder puts a potentially lethal strain on the patient's cardiopulmonary system[55–57] and interferes with his daytime functioning. The narcolepsy syndrome is equally insidious.[38,58–60] Suffice it to say for the purpose of this review, that contrary to some

early beliefs, the disorder is organically based, not psychogenic, and work by Dement and others has demonstrated its strong genetic component.

Disorders of sleep–wake schedule make up the third class of sleep disorders. The recent discovery of a delayed sleep phase syndrome,[49] discussed in the previous section, illustrates this kind of disturbance.

Parasomnias, the final set of disorders, involve dysfunctions associated with sleep stages or partial arousals. Disorders such as sleepwalking, sleep terrors, or sleep-related enuresis, which occur in SWS during specific developmental periods, are examples in this class.

The interested reader may wish to consult the published nosology for a more complete description of disorders within each of these classifications.[52] In addition, however, there are a number of practical publications currently available that provide a general medical overview of sleep disorders.[61–66]

Because sleep complaints are so prevalent in our society, and since many of them are associated with stress, inadequate adjustment, and habits unconducive to sleep, the medical practitioner is faced with a major problem in determining which patient has sleep complaints that require further evaluation and possibly referral to a sleep disorders clinic, and which patient's complaints can be handled more immediately. Sleep scientists who participated in a national cooperative study published in the *Journal of the American Medical Association* in 1982,[54] a study of 5,000 patient records from 11 sleep disorders clinics, made the following recommendation: "Probably the single most important fact that the physician needs to elicit from any patient with a sleep–wake complaint is the duration of symptoms" (p. 1001). Transient symptoms of less than three to four weeks often "can be treated by reassurance and judicious short-term symptomatic relief." A more persistent sleep–wake problem "requires greater effort to arrive at a specific diagnosis." The "greater effort" referred to in the report means that the physician should attempt to gain more objective documentation of the patient's subjective sleep complaint before diagnosing and treating the complaint, and especially before treating the patient with hypnotics, which may exacerbate certain serious sleep disorders such as apnea.

Hypnotics may prove helpful as a short-term solution to problems of sleep initiation or maintenance, but they do not provide a long-term solution. They alter the structure of sleep, and most have carry-over effects during the daytime, especially in elderly adults who cannot

metabolize the toxic buildup of barbiturates and other hypnotics. Benzodiazepines are currently the drugs of choice for short-term management of DIMS. Space does not permit, however, a full discussion of the issues surrounding pharmaceutical treatment of sleep complaints. The interested reader is referred to a number of very recent and excellent books[67,68] and articles[51,69–73] on the topic, as well as to the National Academy of Sciences Institute of Medicine report on sleeping pills, insomnia, and medical practice.[26]

How does a physician obtain more objective information on the patient's sleep complaint, especially a "persistent" sleep complaint? The first and most important step is to interview the patient not only about the complaint and possible medical disorders that might cause it, but also about sleep–wake patterns and habits, including drug intake and daytime activities.

Another helpful and relatively easy step is to interview the bed partner of the complaining patient. This person can often provide a confirming or disconfirming source for the complaint. For example, bed partners of patients with sleep apnea can often describe the snoring frequently associated with this syndrome. In some subjective insomnias (in which the patient insists that he or she does not sleep at night) the bed partner may disconfirm this and indicate that the person sleeps for a substantial period each night. This does not, however, mean that the patient was lying or malingering, or even that the individual suffers from insomnia secondary to a medical or psychiatric disorder. It simply indicates that the person is unable, for whatever reason, to judge the quantity of his or her sleep. Psychiatric or polysomnographic referral may be in order, depending upon what other symptoms the patient and bed partner report and the severity of the complaint. Before such referral the physician may wish to have a sleep log made of bedtimes, arising times, and nap times for two to four weeks. This approach is increasingly recommended by sleep clinicians. Its advantages are that it involves the patient in reviewing his or her lifestyle, it yields data about the relation of waking activity to sleep and night-to-night variability, and it buys time, which often brings a disappearance of symptoms.[62]

Beyond these first three steps to gather objective information on a sleep complaint, matters become more complex and may involve audiotaping or videotaping of nocturnal episodes. Whether or not the physician chooses to venture into these more exotic areas, the final step in objective diagnosis should rest with the polysomnographic and

Questions for Patients with Excessive Daytime Sleepiness (EDS)

1) Have you ever had unusual muscular experiences?

Cataplexy is a sign of narcolepsy which accounts for 65-75% of all EDS patients.

2) Do you snore?

Sleep apnea accounts for 10-15% of patients with EDS and almost all of them snore.

3) What drugs do you chronically use?

5-10% of EDS patients improve when all stimulants, hypnotics, and other medications are withdrawn.

Figure 6. Exploring the basis of excessive daytime sleepiness. (From P. Hauri, The Sleep Disorders. In *Current Concepts*, K. M. Mann, ed. Kalamazoo, Mich.: Scope Publication, Upjohn, 1982, p. 59, by permission.)

multiple sleep latency tests of the sleep disorders clinic, at least for patients suspected of having serious sleep disturbances (especially the DOES).

Inquiries of patients (and their bed partners) suspected of having a disorder of excessive sleepiness should include questions about unusual muscular experiences, snoring, and chronic drug use (Figure 6). If, in addition to excessive daytime sleepiness symptoms, patients report either cataplexy or weaknesses (e.g., in lower limbs) during excitement, narcolepsy should be suspected. Similarly, snoring can indicate sleep apneas, especially if it is irregular (although, of course, many people snore who do not have DOES). Chronic use of stimulants, hypnotics, and other drugs also can result in excessive daytime sleepiness. Any patient suspected of having DOES should be referred to a sleep disorders clinic for confirmation before tracheotomy or amphetamines or other serious medical interventions are prescribed.

While few of us can control certain factors that can occasionally disrupt nocturnal sleep—such as fire sirens, heat waves, and transient

Table 3

Behaviors That Can Improve Sleep

1. Sleep long enough to feel refreshed and awaken at the same time each morning
2. Do not go to bed unduly hungry, tense, or physically stressed
3. Avoid chronic use of sedatives and hypnotics, and do not take caffeine, nicotine, or alcohol near bedtime
4. Use the bedroom and bed for sleep-related behavior
5. Recognize that afternoon naps may help replace lost sleep but evening naps may prevent sleep that night
6. Be aware that you cannot force yourself to sleep and that you should not panic if you cannot sleep

anxiety or depression—most of us can do a number of things that will minimize the likelihood of a poor night's sleep (Table 3).

The amount of sleep we need to feel refreshed varies greatly; for some it is 5 to 6 hours a night, for others it is the proverbial 7 or 8 hours, and for still others it is 9 to 10 hours. Most of us know what the optimal amount is for ourselves, and this is what we should obtain on a regular basis. In addition to attempting to get enough sleep at night, we should make it important to awaken at approximately the same time each morning. This seems to be even more important for proper synchronization than retiring at the same time each night, although this is also recommended.

Feeling relaxed and satiated at bedtime is an essential prerequisite to falling asleep quickly and sleeping well. Hunger, tension, stress, and worry can all interfere with sleep. Chronic dieters may starve themselves on certain days and then wonder why they have trouble falling asleep or staying asleep. Certain bedtime snacks, especially those that are high in carbohydrates, can be soporific[74]; there is some evidence for the value (both active and placebo) of the proverbial glass of warm milk before bed.[75]

Going to bed when emotionally tense is, of course, the source of much transient insomnia. A few simple psychological relaxation exer-

cises can help many patients; clearing one's mind of intruding thoughts, relaxing, imagining a pleasant scene, and, if it helps, counting sheep, are still good advice. Exercise can promote sleep but only when it is done regularly and not near bedtime.

Hypnotics may be useful for management of transient insomnia, but when taken chronically (beyond a month, for example), they can disrupt sleep and wake functioning. In terms of a patient's quantity and quality of sleep, withdrawal from chronic sedative or hypnotic use usually does much more good than it does harm.

Ubiquitous stimulants like caffeine and nicotine also disturb sleep onset and quality when taken near bedtime. These negative effects occur whether or not the individual is aware of them. In addition, withdrawal from caffeine and nicotine, such as when a patient stops smoking, can result in a transient period of sleep disturbance. Alcohol also affects sleep, particularly if taken in large quantities near bedtime. Chronic alcohol abuse seriously disrupts sleep. Alcohol can speed the onset of sleep but it alters sleep structure and affects its quality. Consequently, the use of small amounts of alcohol as a soporific is not generally recommended.[76]

Use of the bedroom and bed for sleep-related behaviors refers to those individuals who, although not convalescing, nevertheless manage to orchestrate the entire evening's activities from their beds. For example, they may watch television, eat, read, and carry on social conversations from the bed. Over-use of the bed for activities other than sleep (excluding sex, of course), can lead to the bed's no longer eliciting sleep; that is, there is a loss of stimulus control. Treatment consists of having the patient use the bed and bedroom exclusively for sleep.[77]

Napping for an hour can help replace lost sleep without disrupting subsequent nocturnal sleep, especially if the nap occurs in the afternoon, when there appears to be an inherent biological tendency toward nap sleep.[41] Some individuals, however, take naps in the evening within a few hours of nocturnal sleep and then find that they cannot go to sleep readily or sustain sleep that night. Surprisingly, these people often have no idea that the evening nap interfered with their sleep, and they may even insist that they do not actually sleep during these naps (although a spouse might contradict this). It should be explained to such patients

that evening naps, even very light ones, may be behind their nocturnal sleep difficulties. Of course, repeated daytime napping can be a sign of a disorder of excessive sleepiness, particularly if it is accompanied by a subjective complaint of daytime sleepiness; these patients should be evaluated closely, as indicated above.

Finally, some patients need to be made aware that a person cannot force himself or herself to sleep, and that if sleep does not come there is no need to panic. Going to sleep is an extraordinarily subtle process; it requires "letting it happen" rather than "making it happen." Most of us simply let the drowsy fantasy or hypnogogic reverie of stage 1 sleep take us deeper into sleep. Encouraging a patient to think about or picture himself or herself in a pleasant scene can often be helpful advice, for it may serve to take the insomniac's mind off everyday ruminations.

But even if none of these recommendations works and the patient continues to report an occasional sleepless night, the most important thing that a physician can do is to reassure the patient that a lost night's sleep will not be harmful medically. Many insomniacs develop fantasies about what will happen to them if they do not sleep. These fantasies feed the panic associated with lying awake at night and make sleep even more impossible. Because many of us occasionally suffer insomnia due to anticipation of a big event the next day, sleep loss often occurs at the most inopportune time—a night before a day when we desperately need to be at our best. Keeping calm in the face of insomnia before an important day is crucial to salvaging what is left of the nocturnal sleep period.

These "rules" contain the essence of a number of systematic behavioral techniques currently used to treat insomnia. They have been distilled here to their crucial elements so that the physician can easily encourage their practice by patients with sleep complaints. This kind of reassurance and suggestion in a doctor's office, from someone a patient trusts, can go a long way toward relieving the sleep problem and the suffering it is causing.

Sleep research has also begun to shed light on other areas of medical concern; from sudden death syndrome, to chronic obstructive lung disease, to endogenous depression, to aging, the promise of sleep–wakefulness research is great. One gets the sense that there are even more phenomenal discoveries just around the corner.

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Abandonment: Actual or Constructive Premature Termination of the Physician–Patient Relationship

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SUMMARY: The relationship between a physician and his patient has been held by both the legal and medical professions to be a special, privileged one. Real and imaginary breakdowns in the relationship, however, have led to many malpractice actions against the physician. One malpractice cause of action is that of abandonment of a patient by his physician. The physician–patient relationship, examples of abandonment, and the physician's defenses are reviewed.

THE term *abandonment* means the unilateral severance (both temporarily and finally) by the physician of his relationship with his patient without proper notice and occurring at a time when the physician's skills are still needed. The term does not include the broader instance of a physician's negligent failure to give proper medical treatment or attention. Although a form of malpractice, that broad instance does not include a termination of the physician–patient relationship and, therefore, cannot be considered abandonment.

Abandonment of a patient can occur only when there is a bona fide physician–patient relationship. The North Carolina Supreme Court delineated the need for this relationship in *Easter v. Lexington Memorial Hospital, Inc.*[1] In *Easter,* the defendant doctor was in charge of the emergency room at the hospital. When the decedent was admitted to the emergency room, the doctor on duty (and not the defendant) examined him and subsequently misdiagnosed his condition. The decedent died shortly after his admittance. Even though the defendant doctor had never seen nor examined the decedent, the plaintiff sued him for abandonment. The court held that no action for malpractice could stand, for there was no relationship or even brief encounter between the decedent and the physician. A physician–patient relationship must be established as a prerequisite for an actionable claim of abandonment.

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The District Court in Kansas examined a factually more difficult case than *Easter.* In *Doran v. Priddy*,[2] a physician was called upon to examine another doctor's patient who had been admitted to the hospital. The physician had some knowledge of the patient but no knowledge of the treatment history nor of the arrangements that the patient's true doctor had made. The "consulting" doctor refused to treat the patient after the initial examination. The court held here that no abandonment occurred as no physician–patient relationship existed. Therefore, the "consulting" physician was under no duty to act towards the patient.

Physician–Patient Relationship

The general principles concerning abandonment are jurisdictionally uniform. Basically, when a physician establishes a physician–patient relationship by agreeing to treat the patient, a duty of the physician is created which entails the devotion of his best efforts to the treatment of the patient as long as needed, unless he is dismissed by the patient or he has given the patient sufficient notice of his withdrawal to allow the patient to find a competent medical substitute.[3] A way in which the relationship can be legally broken is when the condition of the patient is such as to no longer require medical treatment, and of that condition the physician must judge.

Physician's Duty to Continue Treatment — Failure to See Patient. The duty of the physician not to abandon his patient is absolute. This duty encompasses not only the initial treatment but also any follow-up which may be warranted. A Virginia court succinctly stated the general rule as follows: "After a physician has accepted employment in a case, it is his duty to continue his services as long as they are necessary. He cannot voluntarily abandon his patient. Even if personal attention is no longer necessary in the treatment of an injured limb, the physician, if the case calls for it, must furnish the patient with instructions as to its care and his failure to do so might become actionable negligence."[4]

As a general rule, the length of the physician–patient relationship is proportionate to the need of the patient for the physician's care. A physician may be held to have abandoned a patient without making any explicit statement to that effect if he fails to see the patient at intervals necessitated by the patient's condition.[5] Frequency of attendance is as much a part of careful treatment as any other aspect. This rule applies in all jurisdictions in this country. Obstetrics is a fertile field for

allegations of abandonment, and in some cases the courts have accepted it. Failure to see a patient who may well be in labor is generally considered to constitute negligence.[6]

Right to Withdraw, But Duty to Give Proper Notice. A physician possesses the right to withdraw from a case as long as he expressly gives proper notice to the patient so that an alternate physician may be secured. If proper notice is given, withdrawal is not abandonment. The requirement of notice is to ensure that the patient can obtain another physician in time, so that his condition will not be harmed by his physician's withdrawal.

The courts have yet to establish a specific amount of time necessary to fulfill the requirement of notice. The only important and set criterion is that the physician's notice must give the patient the necessary time to secure another physician. The Kansas court stated that the physician "is bound first to give due notice to the patient and afford the latter *ample* opportunity to secure other medical attendance of his own choice."[7] The Texas Court of Civil Appeals held that notice must be *sufficient* for the patient to get another doctor or else the withdrawing doctor would have to find a competent medical replacement for himself.[8] The District Court in Ohio stated that the notice should be *reasonable* so as to give the patient the opportunity to find someone else.[9] Whatever word is used, the notice must give the patient the time to find a substitute physician.

Requirement of Proximate Cause — Negligence Begets Injury. The jurisdictions are uniform in their holding that abandonment is an actionable malpractice action only if the abandonment was the proximate cause of the injury. A mere showing of the negligence of a physician is insufficient to state a cause of action. Before a patient can recover for either negligent failure to admit him to the hospital or abandonment or both, however, he must show that the failure was the proximate cause of injuries to him.[10]

Two cases are illustrative of this requirement. The Connecticut Supreme Court, upon examining this situation, delivered the basic rule as follows: " . . . both a violation of that duty [not to abandon a patient] and proximate cause were both necessary for a recovery against the defendant."[11] The second case, *Rose v. Hakim*,[12] entailed a careful examination of the issue of proximate cause by the District Court of the District of Columbia. The factual situation led the court to hold that the injury resulted from the actions of the hospital's staff and not from

the alleged abandonment of the physician. Since the court found no proximate cause between the injury and the act of abandonment, the plaintiffs were precluded from bringing an action against the doctor for abandonment.

Examples of Abandonment

The following cases are examples of violations of this duty of the physician not to abandon his patient.

Unilateral Express Statement of Withdrawal. An express statement by the physician declaring his intentions to abandon the case is the clearest example of abandonment, and *Norton v. Hamilton*[13] illustrates this. In *Norton,* the defendant physician agreed to give the plaintiff prenatal and postnatal care. The physician, however, continually refused to make house calls when requested by the plaintiff's husband. After one phone call in which the husband implored the physician to attend to his wife, the physician declared that he would have nothing more to do with the plaintiff. The plaintiff's husband was unable to locate another physician in time, and the plaintiff was forced to deliver the infant in her own home without any medical assistance. The Georgia Court of Appeals, after examining both the factual situation and the declaration of the physician, held that the physician abandoned his patient at a crucial stage without proper notice or medical replacement. Therefore, the doctor was liable for any consequences of his lack of action.

Refusal to Continue Treatment — Deeds Speak Louder Than Words. A physician need not expressly declare his intention to abandon his case. Actions alone may be demonstrative of his intent. The physician's duty to treat his patient extends past the initial contact with the patient and includes any follow-ups that are necessary. A physician's refusal to continue treatment without proper notice or replacement may be deemed as constructive abandonment even if no words are spoken to that effect.

The physician-defendant in *Vann v. Harden*[14] abandoned his patient by refusing further treatment. The doctor had set a lower-leg fracture in a cast and then left town for a week without leaving any instructions with the hospital or the patient. An infection soon developed. As the plaintiff-patient was unable to locate the defendant, another physician was called in. When the defendant-doctor returned, he simply refused to examine the patient or to treat him. The court noted that this was a

tragically blatant example of abandonment. The physician's refusal to treat the patient on his return was inexcusable. The defendant became liable for his inaction (in this case, an amputation of the leg).

Refusal to Treat Patient at Certain Time or Place. As with a refusal to continue treatment, a refusal to treat a patient at a certain place or time has been held to constitute abandonment unless it was a condition at the onset. In *Cortez v. Macias*,[15] the defendant-physician delivered and took care of plaintiff's infant son. When the infant became ill, the doctor prescribed medication over the phone. The infant did not improve. The plaintiff was unable to convince the physician to make a house call, so she informed the doctor that she would take her son to the hospital. The doctor assented, yet refused to come to the hospital, only a few blocks from his office. Instead, he phoned in his instructions and told the plaintiff to bring her son to his office when regular visiting hours started. The infant died at the hospital before the physician's office hours had even started. The court found that the infant might not have died if the doctor had gone to the hospital and treated the infant. The doctor's refusal to treat the patient at the hospital was held to constitute abandonment.

A Promise Made is a Debt Unpaid. There are many instances in which a physician does not have to treat a person with whom he has no duty, relationship, or contractual obligation. Once a physician undertakes the treatment, however, the duty to continue treatment arises.

In *Johnson v. Vaughn*,[16] the defendant-doctor was called into the hospital to treat a shooting victim. The doctor arrived in a drunken condition, yet started to treat the victim. The physician failed to perform a necessary tracheotomy, however, and left the hospital without leaving any medical instructions. The victim eventually died of strangulation. The inaction of this physician was held to be negligent abandonment.

A physician's promise to treat a patient and subsequent inaction violates the physician's duty and is further considered negligent abandonment. Such was the situation in *Maltempo v. Cuthbert*.[17] The defendant-doctor had promised the plaintiffs that he would look after their diabetic son, who was in jail for the night. The physician simply called the jail and asked if everything was going smoothly. He neither visited the son in jail nor called the jail a second time. The son died that night while still in custody. The court agreed with the jury that the physician's actions, or lack of, breached his duty to the son as well as to

the parents. The physician was held guilty of abandonment. A physician who leaves a patient in a critical stage of a disease without reason or sufficient notice to enable him to procure another physician is guilty of culpable dereliction of duty for which he is liable.

Failure To Instruct. Abandonment may be held to occur because a physician does not tell a patient to come back for further treatment or does not provide instruction for the patient to follow at home, where these are necessary.[18] Some courts have held that a negligent failure to instruct on the side effects that reasonably could be anticipated was abandonment.[19]

Failure to Follow — Duty to Keep Informed of Patient's Condition. Just as a physician has a duty to keep abreast of his professional knowledge, so he has a duty to keep himself informed of his patient's condition.[20] The frequency and the method or manner by which the physician remains currently informed is determined by his acting according to the standard of care and the circumstances involved. It may simply be by telephone or through visits by or to the patient.

Failure to Admit to Hospital. Failure to admit a patient to the hospital when it is warranted constitutes abandonment. While negligent failure to admit a person who is not a patient to the hospital without an emergency room, when an emergency occurs, is not technically "abandonment" (since no physician–patient relationship has been created), in terms of liability the two situtations are similar. If denial of medical care results in harm to the patient, damages will be awarded.[21] There would not be abandonment if the hospital did not have an emergency room. However, in this situation if care had been started but not completed, there would be abandonment.

Failure to Follow Patient During Patient's Hospitalization. The duty of the physician is to follow the course of a patient and keep himself informed during an illness, and this obviously requires the physician to follow the patient during the hospitalization as long as the patient remains under the doctor's care.[22]

Premature Discharge From Hospital. Discharging a patient from the hospital prior to the time when his condition justifies it has consistently been considered to be abandonment by the courts.[23]

Substitutes and Vacations. A physician who plans to go on vacation has an obligation to his patients to provide them with due notice of that fact and to arrange for a competent substitute or to allow the patient to have

another physician take over the case. When he fails to do so, and his absence adversely affects a patient, he may well be held to have abandoned his patient.

Negligence by a general practitioner who assumed another physician's responsibility for care of a pregnant patient was connected causally with her infant's death, a Louisiana appellate court ruled.[24]

The patient first learned that her physician was on vacation when she called after labor pains started. She was admitted to the hospital, and a call was made to the answering service of the general practitioner who was taking his calls.

The physician called the hospital three times in six hours, but did not request an examination. Only a nurse was in attendance when delivery occurred, and the physician arrived fifteen minutes later. Tests that would have indicated that the baby was in distress after birth were ignored, except for an effort at resuscitation and giving the baby oxygen. The infant died two hours after it was born.

The patient sued her own physician, the general practitioner, and the hospital. The trial court dismissed the suit, finding that the patient did not prove by a preponderance of evidence that either the physician or the hospital behaved contrary to the community standard of care.

On appeal, the court said that the patient's physician was remiss in failing to notify her of his absence, but found no evidence connecting him with the treatment adminstered by the general practitioner or the hospital. The appellate court also found no negligence by the hospital but did find that the general practitioner was negligent.

In a case based on a similar set of facts, a contrary decision was reached.[25] A physician may be liable for the negligence of a substitute physician who provided vacation coverage, a New York trial court ruled, but it based its holding on a finding that the substitute was an "employee" of the primary physician and then applied the rule that an employer may be liable for his employee's negligence.

Whether the substitute is in fact qualified is generally held to be a question of fact for determination of the jury, as is the question of adequacy of notice. When the substitute physician is an intern or a resident, courts not infrequently hold that he is not an adequate substitute and that the attending physician should have exercised a greater degree of control over his treatment of the patient.[26]

Abandonment by Improper Referral. Another form of abandonment occurs when there is improper referral of a patient. A doctor has a duty to refer

his patient to a qualified doctor if he feels unable to handle the case. In *Rise v. United States,*[27] the Federal Fifth Circuit Court of Appeals held that a physician can be held liable if he refers a patient who has need of particular care to a physician who cannot provide that care. Further, even after referral, the physician has a duty to continue a certain degree of supervision of that patient. Not to monitor the patient properly may be held to be negligent abandonment. However, proper referral to a specialist generally removes the possibility of a suit for abandonment by a patient against the referring physician.[28]

Special Forms of Limited Employment

The physician's duty to continue treatment is not absolute. Depending on contractual agreements (both express and implied), a physician may be able to limit his obligation based on what he is asked to do. If the physician–patient relationship is general in nature, then the physician has a duty to continue treatment and attention as long as it is necessary. The physician is under no obligation, however, to enter into such a general contract for treatment. He may limit his duty through a more specialized agreement. That is, a physician may be asked to treat only a particular illness or only at a certain time or place. If such is the case, his duty is terminated upon the completion of the specialized agreement.[29]

Limitation of Practice — Geographic Limitations. A physician, of course, has the perfect right to limit his practice both as to geographical area and as to subject matter. This includes the right not to make house calls. A physician does not have to go to another community to see his patient.[30] The physician is free to specify contractually a reasonable limitation on the time or nature of treatment. He is under no legal obligation whatever to treat patients who wish him to exceed those limitations, in the normal course of events. Failure to exceed those at the request of a patient is not in any way a breach of any legal duty or abandonment. The physician may make reasonable limitations on his practice without the risk of being sued for abandonment.

Agreement for Surgery Only. Unless there is an agreement to the contrary, a surgeon may limit his duty to the operation itself. The court in *Sheridan v. Quarrier*[31] agreed with this theory. In *Sheridan,* a staff doctor participated in an amputation of a toe at the request of the chief of staff so that he could supervise the intern in charge of the operation. The surgeon did not see the patient after the operation. Holding that the

surgeon was brought in solely for the operation, the court further held that the surgeon was not liable for any harm resulting from postoperative care.

Agreement for One-Call or Consultation Only. As with the agreement for surgery only, an agreement for one-call only (explicit or implicit) may limit the duty of the physician to that one call. This frequently occurs in vacation spots where injured tourists visit a local physician to correct an immediate problem. Unless otherwise agreed, that local physician is under no obligation to perform further treatment.[32]

An implicit or explicit agreement for consultation or assistance only may also operate as agreement to limit the duty of the physician. An obvious example would be a physician called in one case to help diagnose a perplexing illness. A physician–patient relationship is not formed in this case. Therefore, the consulting physician would not be able to abandon the patient in the true sense of the word.

This is the same rationale that the Federal Fourth Circuit Court of Appeals used in *Murray v. United States.*[33] *Murray* concerned a disabled veteran who was taken to the nearest Veterans' Administration Hospital for treatment of an apparent mental disorder. The physician on duty diagnosed the disorder as an acute episode of chronic alcoholism. As regulations prohibited the admission of persons suffering from alcoholism, the physician sent the patient, accompanied by an attendant and a guard, to a nearby hospital. In examining the relationship, the court concluded that there was no physician–patient relationship as the physician was merely "assisting" the patient to a hospital where he would be able to receive treatment for his condition. Therefore, no abandonment by the physician could exist.

The same rationale applies to general practitioners or other physicians who deem it necessary to refer a case to a specialist. Unless a physician–patient relationship has been formed, a physician may not be liable for abandonment when he refers the patient to a specialist.

An internist, for example, is not abandoning his patient when he realizes that a surgical problem is involved and insists that the patient consult a surgeon. Similarly, a patient may not successfully allege abandonment when she requests a cardiologist to treat an eye infection and he refuses. However, in such situations the physician should refer the patient to an appropriate specialist.

Brandt v. Gubin[34] involved a defendant-doctor who was a general practitioner; he examined the plaintiff's son and diagnosed him as

schizophrenic. Feeling that he was unable to treat the patient, the doctor referred the son to a specialist or a mental clinic. He further wrote the plaintiffs to tell them of his diagnosis. The son did go to a clinic, but committed suicide while under their care. Finding that the doctor was simply an assisting physician and had not established a physician–patient relationship with the son, the courts held that the doctor had no legal duty toward the son and, therefore, could not have abandoned him.

Physician's Defenses

What defenses are available to a physician faced with a charge of abandonment? The following are examples of the four defenses available to the physician.

Unilateral Severance by the Patient — Failure to Return. Although the physician has a duty to continue treatment of his patient, a unilateral severance of the physician–patient relationship by the patient will terminate the relationship and the physician's duty. The termination by the patient can be expressly declared or implicitly understood from the actions of the patient.

The most common example of termination based on the actions of the patient is where the patient fails to return for further treatment. The defendant-physician in *Williams v. Bennett* had performed a hysterectomy on the plaintiff.[35] Even though the plaintiff made office appointments and the defendant's office called to remind her of the appointments on numerous occasions, the plaintiff never showed up for any of them. The court held ". . . there can be no abandonment of a patient by a physician when the patient has voluntarily chosen not to return to his or her physician, or has discharged or dismissed his or her physician."

Duty to Recall. Unfortunately, a physician may no longer feel safe from the accusation of abandonment when a patient fails to return for treatment. In *Tresemer v. Barke*,[36] the physician inserted an IUD in a patient when this procedure was within the accepted standard of care. A few years later evidence accumulated that demonstrated that the IUD was a dangerous device. The patient had failed to return as the physician had suggested.

Several years later the patient developed serious complications attributable to the IUD. She sued the physician for failure to notify her

that she was carrying a dangerous device, (i.e., a failure of the "duty to recall") as soon as he knew of its dangerousness. This is a form of abandonment.

The California Supreme Court accepted her proposed theory of liability and imposed the "duty to recall" on health care providers. This decision was reached despite the fact that the patient failed to return, and even testified that she knew of the danger from reading popular literature.

Failure to Comply. The same rationale applies to the use of prescription drugs. When a patient gets her prescription refilled *against* the doctor's order and complications arise, the doctor will not be held liable for abandonment if he fails to notify the patient of possible side effects of the drug.

This situation occurred in *Fleishman v. Richardson Merrell, Inc.*[37] The defendant-physician prescribed Triparanol (MER/29) to the plaintiff to combat her abnormally high cholesterol level. The prescription was to run out after two refills. The plaintiff, however, obtained the trade name of the drug and continued to use it, without the knowledge or consent of her physician. Since the plaintiff never returned to the doctor, he had no way of knowing that she was still taking MER/29. Therefore, the doctor did not contact the plaintiff to advise her of the drug's consequences after he learned of the drug's side effects. In an action for negligent abandonment, the court held that the physician was under no duty to the patient. The duty of a physician "can only be owed to one who actually remains under the physician's treatment and who follows the course of treatment prescribed." The same is true when the patient fails to do what the doctor strenuously and repeatedly advises. This failure can also be considered contributory negligence.

Intervening Illness of the Physician. Since a physician has no control over a sudden illness, courts presumably would not consider that he had abandoned his patients if he did not see them for that reason. If possible, however, even a sick physician should attempt to provide substitutes to care for his patients during his illness.

An illness of the physician is sufficient to terminate the physician–patient relationship if the physician gives sufficient notice of the termination or supplies a competent replacement.

The defendant-doctor in *Kenney v. Piedmont Hospital* was scheduled to operate on the plaintiff.[38] The physician, however, did not feel physically well enough to operate because of continuing sinusitis. The doctor's

employee-associate informed the plaintiff of this event and received her consent to do the operation. The associate performed the operation, after which the plaintiff sued for negligent abandonment. Since the defendant-doctor gave notice and supplied a fully capable and qualified medical replacement, his illness, which kept him from operating, was also sufficient to terminate the relationship. Hence, no abandonment. It appears that when a physician suddenly becomes ill, this materially improves the defendant's position in court.

Proper Notice of Substitution. A third defense can be when the physician terminates the relationship after giving proper notice or finding a competent substitute. *Tripp v. Pate*[39] is an example of this situation. In *Tripp,* the defendant-doctor performed knee surgery on the plaintiff. The doctor then left town for five days, but before he left, he ordered postoperative care, medication, special diet, and chest X-rays, and he put his associate in charge. Complications arose. The plaintiff then sued for abandonment. The court held that since the physician left his highly qualified associate in charge, the physician fulfilled his duty toward his patient. No breach of duty means no abandonment.

Unreasonable Behavior of Patient. Payton v. Weaver[40] is illustrative of the defense of unreasonable patient demands or behavior. *Payton* concerned a dialysis patient (the plaintiff) who was under the care of the defendant-doctor. The outpatient dialysis treatment was to continue as long as the plaintiff, having been a serious troublemaker, met and followed certain rules of behavior and compliance. The plaintiff, however, failed to meet these conditions. Because she continued her troublemaking, uncooperative behavior, the physician gave notice of his intention to terminate their relationship. With his notice, the physician also supplied the plaintiff with a list of all the dialysis providers in the area and even offered to help her find replacement care. After an examination of the facts, the court held that the physician gave ample notice to the patient, thereby discharging all his obligations in that area. Therefore, the action for abandonment failed.

A Malpractice Action By Patient Allows Physician to Serve Notice of Termination. The fourth available defense is as yet not clearly defined. It was first proposed in *Hammonds v. Aetna Casuality & Surety Company.*[41] From a reading of the case, it appears that once a patient "knows or suspects that he is the victim of medical malpractice and has expressed an intent to pursue his legal rights," a physician against whom the malpractice action is being brought may give notice and terminate the relationship.

This defense would seem appropriate in order to protect the interests of the physician, but it has not been used extensively and its worth may have to be proved by time.

Actions May Not Speak Louder Than Words

Physicians must be aware that certain patient actions do not automatically terminate the physician–patient relationship:

- mere non-payment of bill[42]
  In several cases, physicians have withdrawn from cases because the patients have refused to pay their past-due bills. The financial question is not a defense to abandonment and does not justify it if the patient needs care. Failure to treat a patient who cannot pay may be legitimate and does not always constitute abandonment, if alternative treatment is easily obtained.[43]
- mere failure to keep an appointment
- mere failure to be compliant
- consultation with another health care provider — a physician must still give "proper" notice

Damages

Where abandonment can be proved and is the proximate cause of injury to the patient, damages will be awarded, since this is a clear failure to comply with the expected standards of skill and care. The facts of a particular case may or may not constitute abandonment, and generally speaking, such determination is left to the jury as arbiters of questions of fact. Unlike most professional liability actions, where expert testimony is required to prove negligence, whether or not abandonment has occurred is usually held to be a matter that a jury of laymen is capable of deciding for itself.[44] When the question is whether the patient's condition required further medical attention, however, expert testimony may be necessary.

Compensatory damages for abandonment are well established. These include special damages for out-of-pocket losses and general damage for pain and suffering.

Punitive Damages. There is only one reported case in which punitive damages have been awarded. During the course of a renal arteriogram, the anesthesiologist went to lunch without being replaced by a comparably

competent substitute. The nurses monitored the patient during this period. The patient developed paralysis from the waist down 48 hours later. She sued for negligence and was awarded compensatory damages only. On appeal the U.S. Third Circuit Court of Appeals held that the jury should have been instructed that the anesthesiologist's abandonment could be considered reckless indifference, for which punitive damages could be awarded.[45]

Conclusion

A physician has no duty to accept a person as a patient in most circumstances. Once he has agreed to treat the patient, however, a physician–patient relationship is formed and with it a duty to continue treatment as long as it is necessary. To breach that duty would constitute abandonment. Abandonment is the unilateral severance of the physician–patient relationship by the physician without proper notice and while his medical services are still needed by the patient. A physician's failure to meet the obligations of attendance upon his patient may constitute actionable abandonment.

That does not mean, however, that a physician may never terminate the relationship. A physician may withdraw from a case only after giving sufficient notice to enable the patient to find other medical help or after the physician finds a competent medical substitute. If proper notice is given, no action for abandonment can stand against the physician. He also has a good defense if the patient violates instructions and terminates the relationship before he is well.

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"Dear Packard"
Francis Packard's Osler Connection

SAMUEL X RADBILL

SUMMARY: A series of letters and cards sent to Dr. Francis Packard, a gifted Philadelphia historian, by Sir William Osler tells of early social and professional life in Philadelphia and Oxford during the early 1900s. Of particular interest is Sir William's sponsorship of medical clubs and encouragement of contemporary medical writers.

IN 1980 a batch of notes and postcards written by William Osler to Francis H. Packard were given to the College of Physicians of Philadelphia by Mrs. Peyton R. Biddle, one of Packard's daughters. The correspondence ranges over a quarter of a century, from 1893 to 1919. In addition, the College has another collection of letters by and about Osler; they extend from 1884, the date of his first arrival in Philadelphia, to his death in 1919. Most of these were preserved by Mr. Perry C. Fisher, College Librarian during the entire duration of Osler's love affair with our Library. Some of the subject matter of this correspondence has already been brought to light by Harvey Cushing and others, but much of it, especially the part that has not yet seen the light of day, is still of great interest to Osler fans. For the sake of the growing tide of Oslerophiles, and for the glimpses into the development of American medical historiography, selections from this material are presented here with occassional illuminating notes.

The first of the Packard letters is dated 1893. Even though Packard, in his reminiscences of Osler many years later, said his first personal relations with Osler began that year, it is more than likely he was thrown into the magnetic field of Osler's charm almost as soon as the mastermind of Montreal burst upon the Philadelphia scene in 1883. Packard was at that time an impressionable stripling of seventeen. His father, John Hooker Packard, was a famous Philadelphia surgeon who was active at the Pennsylvania Hospital and a devoted Fellow of the College of Physicians of Philadelphia. Osler gravitated at once to both of these institutions because their libraries were richly stocked with classical medical works. Packard's older brother, Fred, was already a

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medical student at the University of Pennsylvania when Osler arrived there, and Fred was immediately fascinated with Osler. Upon graduation Fred Packard served as one of Osler's residents in the Hospital of the University of Pennsylvania, and when Osler left for Johns Hopkins University in 1889 Osler invited him to join him in Baltimore. The Packard-Osler ties were tightened further when Frank Packard married Elizabeth Wood—her father, Horatio C Wood, had gone to Montreal and returned to Philadelphia filled with enthusiasm for Osler, and it was he who afterward was largely instrumental in bringing him to the University of Pennsylvania.

When Osler arrived in Philadelphia, he was accorded a cordial welcome among the medical elite of the City. He was promptly elected to the Rittenhouse Club, the University Club, and such selected dining clubs as the Mahogany Tree, the Biological Club, and the Medical Club. He was a constant attendant at both the dinners of these groups and those held at private houses, and it is quite likely that young Frank Packard met Osler at some of these social affairs.

In 1885, just a few months after his arrival, Osler was elected a Fellow of the College of Physicians of Philadelphia. A year later we find him already a member of the Library Committee (in association with S. Weir Mitchell, I. Minis Hays, and the Honorary Librarian, Frederick P. Henry). Osler's concern for this library continued unabated for the rest of his life. At his death he bequeathed to it his treasured 1348 manuscript copy of Bernard de Gordon's *Lilium Medicinae* and specified that the chairman of the Library Committee of the College of Physicians of Philadelphia should serve as one of the curators of the library that was to be set up in Osler's name at McGill University.

Francis Packard was an undergraduate student in the Biology Department at the University of Pennsylvania during the period in which Osler, 20 years his senior, was teaching in the Medical School there. In 1892, when Packard graduated from the medical school, Osler was already in Baltimore and heading the medical service at the Johns Hopkins Hospital, teaching graduate students, writing, and organizing the medical school (which was to open the next year, 1893). After graduation, Packard wanted to obtain a residency at the Pennsylvania Hospital, where his father and brother were on the medical staff, but he had to wait for a year before he could be accommodated. When Osler learned that Packard was available, he invited him to come to the Johns

Hopkins Hospital. There, even though no staff position was open, Packard was able to work in the pathology laboratory and to make rounds on the wards with Osler.

It was during this period that Packard came directly under the influence of the great teacher. The chief result of this association was that Osler directed Packard's inclination towards the history of medicine, a subject that Osler loved to ignite in his young students. By the time Packard returned to Philadelphia as an intern at the Pennsylvania Hospital, he was already steeped in American medical history. There he soon became engrossed in the hospital's library, one of the oldest in this country. In the introduction to the first edition of his *History of Medicine in the United States* of 1901, Packard acknowledged his debt to Osler as "a stimulator of medical history in this country."[1] Later, in reminiscences of Osler, he pointed out that "to Osler's influence more than any other one cause is due the great awakening interest in the study of medical history."[2] Surely, this awakening applied to no one more than it did to Packard himself.

The Letters

The first letter is dated November, 1893, and was sent from the familiar address, 1 West Franklin Street. It is one of the characteristically brief, hastily scribbled Oslerian notes: "Dear Packard: Come at 7 pm tomorrow (eve) and take dinner with us—if you are not engaged. Do not dress."

This was evidently written while Packard was working with Osler in Baltimore. A vacancy had opened on the resident staff at the Johns Hopkins Hospital, and Osler offered it to Packard. Packard had accepted with alacrity, but the same day a telegram came announcing his appointment to the Pennsylvania Hospital. Packard's father and brother both urged him to accept the Philadelphia offer. He was in an embarrassing quandary and asked to speak to Osler. The note may have been in answer to that request.

1. Francis Packard, *History of Medicine in the United States* (Philadelphia: J. B. Lippincott, 1901), p. xiv.

2. Francis Packard, "Sir William Osler and the Library of the College of Physicians of Philadelphia," *Transactions and Studies of the College of Physicians of Philadelphia* 42 (1920): 150.

Edith Reid wrote that dinner with the Oslers was very much like dining with a fraternity with Dr. Osler as chairman.[3] At this dinner in 1893, Osler lectured glowingly on the glories of Philadelphia medicine. He reminded Packard of his grandfather, George B. Wood, who was one of the Quaker City's medical heroes and who had written a stirring history of the Pennsylvania Hospital. Osler also advised Packard to leave for home at once. It may well have been this dinner discourse that instilled in Packard a particular bent for American medical history.

Packard never lost touch with Osler. The second letter in the collection was written eight years later, in 1901. By this time Packard was editor of the *American Journal of the Medical Sciences* and Osler was a contributor and associate editor. Much of their ensuing correspondence concerns this journal. In 1901 Osler was impressed by Sir Michael Foster's Lane Lectures on the history of physiology, delivered at the Cooper Medical College in San Francisco in 1900 and published the following year. Osler promised to send a review of the book but dallied with it for more than a year. After mentioning it three or four times in subsequent letters, he finally had his ubiquitous secretary, Miss B. O. Humpton, send it to Packard. In these letters, some other medico-historical works that Osler called to Packard's attention for review were Stephen Paget's *Memoirs* (1901) of his father, Sir James Paget, and Joseph F. Payne's Fitzpatrick Lectures, *English Medicine in Anglo-Saxon Times* (1904).

In a letter of November 2, 1901, published by Harvey Cushing in *The Life of Sir William Osler,* Osler refers to the new historical club inaugurated in Philadelphia.[4] This club is mentioned again in a letter to Francis Packard's older brother, Fred, when Osler says he would be only too glad to come to the club and adds enthusiastically: "How satisfactory it is that he [Frank] has taken up the historical work."[5] In the same letter Osler praises the first edition of Packard's *History of Medicine in the United States* as "really a great credit."

Packard had read papers of historical interst to the H. C. Wood Student Medical Society at the University of Pennsylvania in 1897 and

3. Edith Reid, *The Great Physician* (Oxford: Oxford Univeristy Press, 1931), p. 134.

4. Harvey Cushing, *The Life of Sir William Osler*, 2 vols. (Oxford, The Clarendon Press, 1925), 1: 567.

5. Osler to Frederick Packard, 4 November 1901, Osler Correspondence, The College of Physicians of Philadelphia.

again in 1899. That year he also addressed the Judson Daland Medical Society, another student group at the University. In 1900 we find him reading historical papers at the College of Physicians of Philadelphia and germinating there the Section on Medical History, officially established in 1905 with Roland G. Curtin as chairman and William Pepper III as clerk. Packard himself served as chairman from 1913 to 1922, and again in 1936. Backed by such other Philadelphia medical history enthusiasts as David Riesman, E. B. Krumbhaar, and William G. Leaman, he annually introduced the students of the five medical schools of this city to the rich heritage of medical lore found at the College of Physicians of Philadelphia. The venerable Abraham Jacobi came from New York on April 2, 1905, as the first speaker at the newly founded Section. Through the years a succession of medical notables from near and far followed him on the podium; William Osler was prominent among them.

In 1905 Osler invited Packard to address the Book and Journal Club in Baltimore, a small coterie he had initiated at the old Medico-Chirurgical Faculty of Maryland as soon as he had arrived in that city. He had gathered similar groups in Montreal and in Philadelphia to keep abreast of the latest medical advances. However, Osler's penchant for medical history was not to be denied at these meetings. Packard spoke to them about the "Resurrectionists of London and Edinburgh," and this address was published in the *Medical News* in 1902. Osler was delighted with it and requested copies for his Maryland friends.

Along with John Shaw Billings and William H. Welsh, Osler later organized the Medical History Club at the Johns Hopkins Hospital. Packard again was solicited for papers. In response to a note on November 1, 1902, from Osler, he chose as his topic "The Author of Rab and his Friends: Dr. John Brown of Edinburgh."

One group of letters in the collection deals with Packard's contribution to Osler's eight-volume *System of Medicine.* This batch includes holograph letters from Thomas McCrae as well as other material relating to the publication of the *System.* McCrae, one of Osler's Canadian protégés, married Osler's niece, Amy Gwyn. Later McCrae was professor of medicine at Jefferson Medical College in Philadelphia, where Mrs. Osler's former husband, Samuel W. Gross, her father-in-law, Samuel D. Gross, and her ancestor, John Revere, had all been prominent members of the faculty. McCrae prepared a memoir of Osler in 1910 for the College of Physicians of Philadelphia. He wrote a number of historical

papers, became an associate editor of Packard's *Annals of Medical History,* and was inducted into the Charaka Club, a New York clique of elite Cliophiles who had also drawn Osler into their exclusive circle.

The correspondence with Packard continued even after Osler migrated to Oxford. Osler alerted Packard when Dr. Harmer, a London otolaryngologist, visited America. When Packard prepared for publication an edition of William MacMichael's *The Gold-Headed Cane,* Osler endorsed the project heartily, wrote an introduction, and distributed copies of the book among his friends. Osler became even more excited when Packard embarked upon an edition of Sir John Harington's *School of Salernum,* of which he possessed the original manuscript. A page from Osler's manuscript is reproduced in this book.

The correspondence during the last years of Osler's life reflected the harassment of World War I. Many remarks in the letters indicate the anxieties of this vexatious period of his life.

At this time Osler manifested a lively interest in Packard's plans for launching the *Annals of Medical History.* He wanted to know all about Paul Hoeber, the publisher, and suggested names of many potential contributors. As a result, Packard was able to join the names of Garrison, Cushing, Jacobi, and others with that of Osler in an impressive array of associate editors.

Several sad notes near the end of the correspondence relate to the death of Osler's son, Revere. On September 5, 1917, Osler wrote: "Dear Packard: What a mercy that all you dear fellows were with our laddie at the end. It does make such a difference in our feelings. Heartfelt thanks from us both." Packard had been working in a clearing station in Belgium on August 13, 1917, when he learned that Osler's son had been brought to a nearby station where, with a friend, Dr. Charles F. Mitchell, he found that the boy had just died of shell wounds. In company with a number of Osler's ex-students and associates who were in the neighborhood, Packard accompanied the body to the trench in which it was buried. The American officers—Cushing, Brewer, St. John, Woolsey, Mitchell, and Packard—thus had the melancholy privilege of demonstrating their love and respect for Sir William by attending the funeral of his only son. A message of sympathy also brought a written response from the youth's bereaved mother.

Soon after Revere's death, a Chicago otolaryngologist, Dr. Joseph C. Beck, had lunch with Lady and Sir William Osler at Norham Gardens. In his reminiscences Dr. Beck mentioned how much he was impressed by

the calmness with which Osler spoke of their son.[6] While Osler practiced the "aequanimitas" he preached to his students, his inward anguish undoubtedly shortened his life.

Near the close of the correspondence there is an account of Osler's seventieth birthday celebration at the Royal Society of Medicine of London on July 11, 1919. This account was published by Packard in the *Annals of Medical History.* The final item is "Ariphon's Hymn to Health," which Osler forwarded to the *Annals* with a personal note.

While much of the import of these letters has already been disclosed in the literature, the original seventy-odd items in the collection afford a more intimate and accurate insight into the human side of Sir William Osler and yield a glimpse of his way with one of his apostles.

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6. Joseph C. Beck, *Fifty Years in Medicine* (Chicago: McDonough, 1940), p. 18.

The Person in the Patient: An Appreciation of Dr. Paul Tournier

FRED B. ROGERS

DOCTOR PAUL TOURNIER of Geneva, Switzerland, marked the publication in the United States of his book, *The Healing of Persons*, by a six-week lecture tour in March and April of 1965. I was fortunate to meet him and hear his talk on this topic at Philadelphia's Episcopal Church of the Resurrection, then located next to Temple University Hospital and to this day under the rectorship of the Reverend James M. Harvey. Doctor Tournier, an eminent psychiatrist, emphasized in his remarks the need to incorporate spiritual insights into one's professional work.

A prolific author, Tournier has written sixteen books, the last appropriately titled *Learn to Grow Old.* This book and his classic *Healing of Persons* were issued in paperback editions by Harper & Row, Publishers, in 1983. His books published in English translation in this country include *A Doctor's Case Book in the Light of the Bible* (1960), *Escape from Loneliness* (1962), *Guilt and Grace* (1962), *The Strong and the Weak* (1963), *The Whole Person in a Broken World* (1964), *The Healing of Persons* (1965), and *Learn to Grow Old* (1983). They provide persuasive examples from his medical practice of the need for human understanding in the care of patients. Psychosomatic illness, he asserts, is a reciprocal process; a sick body produces worry, and worry can produce a sick body. Thus the doctor's province is the whole person, body and soul.

Respect for human personality runs through Tournier's writings, providing a serene and luminous view of modern life and its problems. Optimism and courage, he writes, help relieve human anxiety, suffering, and mortality. Mellow and spirited, his message urges a joyous acceptance of living. It is full of compassion, sagacity, and solace. Two articles documenting his American tour augment this viewpoint. They are "Psychotherapy and the Care of Souls" (*The Johns Hopkins Hospital Nursing Alumnae Magazine* 64 (3): 51–56, Sept. 1965) and "The Healing of Persons" (*Medical College of Virginia Quarterly* 1 (4): 30–35, Winter 1966).

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Born in 1898, Paul Tournier received his medical education in Paris and Geneva. He practiced general medicine and psychiatry in Geneva from 1928 until retirement. His emphasis upon the person in the patient allied him with numerous colleagues whose concerns included the psychological sciences pertaining to being, becoming, and behavior. Their application of religious faith in medicine reflects the biblical wisdom of Joshua ben Sira, who wrote as follows in *Ecclesiasticus* 38:14:

> *The physician, too, beseeches God*
> *That his diagnosis may be correct*
> *And his treatment bring about a cure.*

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REVIEW

GEVITZ, NORMAN. *The D.O.'s: Osteopathic Medicine in America.* Baltimore: The Johns Hopkins University Press, 1982. 183 pages, illustrated. Price $18.50, hardcover.

Reviewed by EMANUEL FLIEGELMAN

THERE is nothing more gratifying to an osteopathic physician than to read and review a book authored by a professional from a discipline other than medicine. Dr. Norman Gevitz teaches sociology at the Illinois Institute of Technology in Chicago. He selected the subject of osteopathic medicine and its history as his dissertation topic. He was led to this subject by David Oxman, M.D., and William Cummings, Ph.D.

His objectivity is seen in his method of dividing the book into ten chapters. Early on, he discusses the growth and development of Andrew Taylor Still, the founder of the philosophy, view of pathology, and system of patient care characteristic of osteopathy, a radically different approach to healing. Stills's revolutionary attitudes began with his support of the Abolitionist movement and his realization during service in the Civil War that few physicians were adequately trained. Aware of the multitudinous approaches to diagnosis and treatment of disease, he devised this alternative medical system—osteopathic medicine.

Stills's popularity grew and people flocked to Kirksville, known as the Missouri Mecca, where, in 1892, the American School of Osteopathy was opened. Other osteopathic schools began to emerge, causing some infighting and competition. Then standards were updated, and new additions to curriculum were instituted. The American Osteopathic Association was organized in 1897; it maintained levels of medical education and set up legislative committees. There were many battles to be won because there were frequent instances of opposition and efforts by the orthodox allopathic profession to eliminate this upstart system of medicine.

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The author elaborates about basic theories of osteopathy; his research was gleaned from the archives of the American Osteopathic Association. Deans of various colleges, as well as prominent osteopathic physicians, were interviewed.

Dr. Gevitz relates in detail the "California Merger Story," a critical moment for osteopathic medicine in 1961. A controversy arose between the California State Osteopathic Society and the American Osteopathic Association. The state association seceded and merged with allopathic medicine, while the rest of the country maintained osteopathic medicine as a separate profession. Since then, nine new osteopathic colleges are functioning successfully. At present fifteen medical schools embrace the holistic philosophy of osteopathic medicine.

The author carefully evaluates the present and the future. He justifiably recognizes some of the problems resulting from the phenomenal growth of the profession. At the same time, as the scope of practice and philosophy has broadened, many practitioners would like to have an "MD" after their name, which might dispel the persistent myth that the osteopathic physician is a "bone doctor."

Norman Gevitz observes that DOs have met and overcame serious challenges in the past. He quotes the AOA editor, George Northrup:

> Those who make gloomy predictions erroneously believe that we do not recognize the problems, and if we do, are unable to solve them. Our present status, growth, and strength are visible proof that we did not concentrate on the negative aspects of our problems, but accepted them as creative stimuli to progress. The only really new and added danger is, ironically, our success. Our greatest danger is that our success will give birth to complacency, and only complacency will do us in. The future of osteopathic medicine is not in the hands of those who oppose us, but rather in the hands of those who believe in it the most.

The bibliography is extensive and evenhanded, demonstrating conscientious research. If this book were written now, the 1984 issue of *Patient Care* would have been included in the bibliographic list. Two articles were published there that described utilization of manipulative therapy by DOs before a panel of MDs. We have indeed come a long way!

This book should be read by and placed in the libraries of the 21,000 osteopathic physicians who serve 20 million Americans as primary

health care physicians. This is the best history of osteopathic medicine that I have ever read, and it taught me some facts of history that I did not know, in spite of the fact that I grew with the profession. I recommend to other disciplines to look at its rapid growth, artistically woven into this monograph.

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REVIEW

L'ETANG, HUGH. *Fit to Lead?* London: William Heinemann Medical Books, 1980. 211 pages. Price apx. $15.00

Reviewed by ELEANOR LANSING DULLES

THIS wide-ranging book, based on the earlier *The Pathology of Leadership*, is revealing. In his discussion of the medical conditions of public figures, the author provides us with a list of physical ailments that is long and frightening—diabetes, strokes, and heart attacks; overwork and alcoholism; self-medication, age, and many other distressing causes of failure, aberration, eccentricity, and irrationality.

This survey of past problems is well worth reading. It suggests the need for increased vigilance in the election and appointment of leaders in order to reduce the threat of major errors in decisions and policy. There can be no full protection from the many and often unpredictable afflictions that distort the vision and limit the effectiveness of statesmen. This book is written by a physician and, although serious in tone, it is an interesting and readable review of a wide panaroma of leadership.

Doctor L'Etang stresses the responsibility of the voter and indicates the need for examination and revelation of the fitness of those in high positions. The concealment of incipient illness may have caused the failure of Western powers to confront Stalin effectively at Yalta, since both Roosevelt and, to a lesser extent, Churchill suffered from failing health. The well-known catastrophe in Suez in 1956, when Anthony Eden fluctuated between aggression and weakness as he ordered the attack on Egypt, is reviewed in light of his impending disease while he was prime minister. Less well known were the early strokes of Churchill from 1951 until his death in 1965.

The responsibility for the fall of France in 1940 was partly attributable to the illness of General Maurice Gustav Gamelin. Several others, also unfit to lead, shared the blame for what may have been the inevitable collapse.

The discussion of Eisenhower's abdominal and cardiac attacks does not take full account of the resilience of a man who was clearly in

Mrs. Dulles, for twenty years an officer in the Department of State, has taught and written extensively on the problems of economics and government.

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command of his faculties even after he left the presidency. Those of us who saw him in the 1960s can attest to his buoyant and vigorous bearing in his last years.

The afflictions which President Kennedy suffered were known but partially hidden from the public by his interest in sports—swimming, sailing, and touch football—and his impressive youthful appearance and resounding diction in many well-remembered speeches. There is no evidence that his Addison's disease seriously affected his meeting in Vienna with Krushchev or his handling of the Cuban crisis.

In contrast, the illness, now well known, of President Wilson definitely altered his behavior in Paris during the negotiation of the Versailles treaty and his subsequent dealings with Congress. At that time, the public did not adequately assess his condition which, we came to see, was a decline of serious consequence. Those close to him concealed his grave condition, then known only to a few, including Secretary Robert Lansing.

There is a great deal of history packed in this short volume, and it serves as a reminder of the vulnerability of a political system that provides inadequately for such unanticipated contingencies.* Stress is constantly growing as nations draw closer without finding ways of reducing the impact of conflict. One concludes that as more is known of human weakness, the changes in command and the shifts in power are likely to become more frequent.

There is no adequate solution, but at the same time there must be a greater recognition of the stress on decision makers and the likelihood of breakdowns. Further study of the problems and the nature of measures to be taken in case of physical deterioration (and, one must add, assassination) of statesmen is needed. This discussion of stress, anxiety, and overwork leads one to consider with some tolerance the relaxation times, vacations, golf games, and fishing trips of American presidents.

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* Among those who are included in the analysis are Gamal Nasser, Achmed Sukarno, Joseph Stalin, Douglas MacArthur, Lyndon Johnson, Helmut Schmidt, Adolf Hitler, Sir Robert Vansittart, Vyacheslav Molotov, Georges Pompidou, Leonid Brezhnev, and Krishna Menon.

REVIEW

DiMATTEO, M. ROBIN, and D. DANTE DiNICOLA. *Achieving Patient Compliance: The Psychology of the Medical Practitioner's Role.* New York: Pergamon Press, 1982. 333 pages. Price $35.00 (cloth); $12.95 (paper)

Reviewed by SYLVAN H. EISMAN

IN any discussion on how to improve or understand patient compliance with a physician's instructions (or to understand why patients fail to comply with advice given by physicians), it must be realized early, as mentioned in this volume, that the busy practitioner or clinician often does not have adequate opportunity or time to explain his instructions and recommendations fully and to justify the prescriptions which he employs in his care of the patient. The limitations of time frequently hamper the explanation.

This fundamental problem undermines the benefits of this book, a scholarly, in-depth study of the social and psychologic issues at work in the compliance of patients in following instructions and carrying out the recommendations of their doctors. The book is well written, but this reviewer believes that it is too detailed for the average practitioner to study and to use as a meaningful addition to his library. There is no fault to find with the studies demonstrated and reported within this volume, and there are a huge number of references to studies done elsewhere in the matter of achieving patient compliance, but the busy practitioner will not have the time to review this whole issue in depth.

It would seem that the early part of the book (in fact, the first two chapters) covers most of the problems raised in this special interface between patient and physician. The reader learns very early that the physician who expends much time in explaining the need for following his instructions will indeed probably achieve a higher degree of patient compliance, providing such "extraneous" issues as economics, family pressures, availability, and time on the part of the patient can be eliminated. Unfortunately, the busy physician who does not have the

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time to develop his instructions in depth would probably find the compliance of his patient to be reduced accordingly.

The volume is indeed a scholarly approach to the problem. Whether the practicalities and exigencies of day-to-day clinical practice are taken into consideration is, however, uncertain. In this reviewer's opinion, the average practitioner would indeed prefer to have his role, as well as the patient's role, more succinctly defined and described, so that a better rapport and a more effective relationship between physician and patient can be achieved.

To summarize, the book is a fine study concerning the problems of patient compliance, but from the standpoint of the clinician, it is too detailed and too involved to be of major practical use. The volume is of special interest to sociologists and psychologists who study these problems in depth and frequently do so very well, but I suspect it will be of less interest to the practicing physician.

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REVIEW

STINSON, ROBERT AND PEGGY. *The Long Dying of Baby Andrew.* New York: Atlantic–Little Brown, 1983. 367 pages, preface, index. Price $16.50

Reviewed by HENRY M. DRINKER

THIS long and moving book is a well-documented commentary on the ability of modern medicine's sophisticated techniques to prolong suffering as well as to heal. The book draws on the parents' recollections and diaries and on the Pediatric Hospital Center chart.

On December 18, 1976, Professor Stinson's sabbatical was abruptly disturbed by the birth of Andrew in the community hospital. The child's gestational age was 24 to 25 weeks, and his birth weight was 800 grams (1 lb. 12 oz.).

After initial resuscitation by Dr. Nielsen, Andrew did well for five days. Then, because of their son's increasing apnea, the Stinsons were advised to send him for tertiary care to a Pediatric Hospital Center 50 miles away.

The transfer was by private ambulance after the Stinsons signed an all-inclusive permission for treatment, and they did not call the PHC to speak to an attending pediatrician on the day of transfer.

Three days later, after one call from a resident, the Stinsons arrived at PHC to have a conference with Andrew's physicians. There was disagreement from the beginning about putting Andrew on a ventilator, and the arguments with the attending physicians continued until Andrew's death. Transfer to the PHC almost completely severed the Stinson's emotional bond with their baby and they resisted all efforts to become bonded to him again.

During Andrew's life he developed an awesome number of complications:

1) Intercranial hemorrhage
2) Hydrocephalus
3) Septicemia
4) Urinary infection
5) Gangrene of a leg

Dr. Drinker is Director of the Department of Pediatrics at Chestnut Hill Hospital.

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6) Multiple rib and extremity fractures
7) Pulmonary hemorrhage
8) Pulmonary hypertension
9) Bronchopulmonary dysplasia
10) Complete erosion of the soft palate
11) Retrolental fibroplasia

As each complication occurred, the parents requested that the ventilator be discontinued and Andrew be allowed to live or die without artificial interference. No emphasis was placed on all the painful blood-sampling, bladder punctures, spinal taps, antibiotic injections, and suctionings that Andrew was subjected to hourly.

The Stinsons were certainly justified in their annoyance at being shunted to the care of a new attending physician and resident each month. They would have had much more continuity if they had arrived with their infant when he was admitted and learned then of the staff hierarchy, schedule, and philosophy. However, they did retain a close relationship with their first resident, Jeff Perlman, and the book is dedicated to him.

A chapter or postscript by one of the attending physicians would be a welcome addition to this fascinating work. We would appreciate knowing why the attending physician continued to expect Andrew's recovery, despite awesome complications, until just before the child's death.

The Long Dying of Baby Andrew is an intelligent and beautifully documented work that brings up many ethical questions and points out the glaring problems that are sometimes encountered in high-technology medical care. Anyone would find this book engrossing and disturbing.

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Leah M. Lowenstein
1931–1984

LEWIS W. BLUEMLE, JR.

LEAH M. LOWENSTEIN, Dean and Vice President of Jefferson Medical College, died on March 6, 1984, in Wellesley, Massachusetts, at the age of 53. During her tenure as dean at Jefferson Medical College, Dr. Lowenstein also served as professor of both medicine and biochemistry. She was the first female dean of a coeducational medical school in the history of American medicine.

Doctor Lowenstein, whose career was widely recognized as an exemplary model for women in medicine, received her B.S. and M.D. from the University of Wisconsin, where she was one of only three women in her medical school class. After interning at Wisconsin, she traveled to Oxford University with her husband, John, where she served as a research associate in anatomy from 1955 to 1958. She subsequently returned and completed her internship in internal medicine at Harvard Medical School's Beth Israel Hospital in 1959.

Throughout her professional life, Doctor Lowenstein applied her clinical and scientific training to academic positions of increasing responsibility. After a fellowship in renal and metabolic disorders at Tufts University School of Medicine, she joined the faculty of Harvard Medical School and eventually became director of its Alcohol Research Unit at Boston City Hospital. Thereafter, she went to the Boston University School of Medicine and progressively served as physician-in-chief of the medical service at Boston City Hospital, as professor of both medicine and biochemistry, and as assistant dean. At the same time, Doctor Lowenstein was a medical advisor and consultant to numerous federal departments and committees. Prior to coming to Jefferson Medical College in 1982, she headed the Boston University School of Medicine's unit on metabolic nephrology and directed its Gerontology Center's basic and clinical sciences group.

Doctor Lowenstein was a member of the governing council of the National Academy of Science's Institute of Medicine and a member of

Dr. Bluemle is President of Thomas Jefferson University and a former President of the College of Physicians of Philadelphia.

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Phi Beta Kappa and the Alpha Omega Alpha medical honor society. She was a fellow of the American Association for the Advancement of Sciences and vice-president of the council on the kidney in cardiovascular disease of The American Heart Association.

Doctor Lowenstein published extensively on kidney and metabolic disorders, lectured throughout the country and abroad, was on the editorial board of a number of professional journals, and coedited several books, including *Becoming a Physician: Development of Values and Attitudes in Medicine.*

She was accomplished in areas outside of medicine as well; she was a concert cellist and earned her doctorate in philosophy while at Oxford. Last year, the University of Wisconsin awarded her their annual Medical Alumni Citation.

In addition to her adminstrative skills, Doctor Lowenstein was an excellent teacher who always emphasized the human aspects of medical care. Jefferson Medical College and the entire medical community will miss her.

Thomas Jefferson University
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ACADEMIA

Items of Interest from Philadelphia Medical Centers

Hahnemann University. A grant of $5.7 million has been received from the National Cancer Institute to investigate the use of interferon in controlling cancer. The lines of approach of the project include clonogenic assay and gene photocopying techniques to monitor oncogene activity and potentiating action of a new drug, Ampligen™, which stimulates the body's production of interferon. *Isadore Brodsky, M.D., William Carter, M.D.,* and *David Gillespie, Ph.D.,* will collaborate with scientists at the National Cancer Institute and The Johns Hopkins University.

Victor Herbert, M.D., J.D., has been named professor and chairman of the Department of Medicine. Dr. Herbert, a graduate of Columbia University College of Physicians and Surgeons and the Columbia University School of Law, served recently as vice chairman of medicine at the Downstate Medical Center in Brooklyn and at the V.A. Medical Center in the Bronx.

The appointment has been announced of *Michael R. Spence, M.D.,* formerly associate professor at the Johns Hopkins University School of Medicine, as professor and chairman of the Department of Obstetrics and Gynecology.

Temple University. A research project is under way, directed by *James F. Spann, M.D,* professor of medicine, to evaluate the efficacy of clot-dissolving streptokinase when used intravenously in the treatment of myocardial infarction.

A pilot program is in progress to supplement physicians' continuing medical education by their participation in a research program in their own practice. Participants will study a monograph on the diagnosis and treatment of hypertension, will test-treat and monitor a number of patients, and will submit a report subsequently analyzed by those directing the program. Participants are then graded and their scores compared with those of other volunteers. The enterprise is under the direction of *Albert J. Finestone, M.D.,* and *Salvatore S. Lanzilotti, Ed.D.*

The Medical College of Pennsylvania. At graduation exercises in May, 132 students received their graduate degrees; these included 12 who earned undergraduate and M.D. degrees through a special six-year, accelerated, joint program with Lehigh University. An honorary degree was awarded *Richard A. Seltzer, M.D.,* commencement speaker and surgeon-writer. *Jan Schneider, M.D.,* professor and chairman of the Department of Obstetrics/Gynecology, and *Michael C. Phillips, Ph.D., D.Sc.,* professor of biochemistry, received Christian R. and Mary F. Lindback Awards for excellence in teaching.

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Peter R. Kowey, M.D., was a finalist in the 1984 A.N. Richards competition sponsored by the Physiological Society of Philadelphia. Dr. Kowey, medical director of the coronary care unit, was thus cited as one of the most promising local researchers under the age of 35 in the field of physiology.

A Mary DeWitt Pettit Fellowship and grant of $10,000 has been awarded *June M. Fry, Ph.D., M.D.,* director of the Sleep Disorders Center, for her study of the effectiveness of codeine in the treatment of narcolepsy.

Helen M. Horstmann, M.D., has been appointed chief of pediatric orthopedics. The new chief of the orthopedic surgery section is *Henry H. Sherk, M.D.*

A Depression Clinic is in operation under the direction of *Edmond H. Pi, M.D.*

The Annual Achievement Award has been given to alumna *Eleanor D. Montague, M.D.,* a radiation therapist at the M.D. Anderson Hospital and Tumor Clinic.

Under the direction of *Ira Katz, M.D.,* a clinic has been established to study and treat anxiety in the elderly.

Thomas Jefferson University.

Joseph S. Gonnella, M.D., professor of medicine, has been appointed dean of Jefferson Medical College.

In April a series of luncheon programs was presented that dealt with women's health. Speakers included *Gordon F. Schwartz, M.D., Martin Weisberg, M.D., Loretta Finnegan, M.D., Brenda Byrne, M.D.,* and *Howard Kent, M.D.* Topics covered included infertility, stress, breast cancer, child bearing, and effects of smoking.

Under the direction of *Daniel C. Goldberg, Ph.D.,* a Women's Sexual Health Program has been created to evaluate and treat women's physical and psychological sexual problems.

A pilot program is under way with the aim of giving medical students practice in improving communication skills before they begin their clinical clerkships in their third year.

A team headed by *Clorinda G. Margolis, Ph.D.,* clinical professor of psychiatry and human behavior, carried out a controlled study on the use of hypnosis as an aid to a patient's response to burns.

In June commencement exercises in the Academy of Music, 504 students received degrees in nursing and allied health professions and doctoral degrees in medicine and the basic biomedical sciences. *John A.D. Cooper, M.D., Ph.D.,* president of the American Association of Medical Colleges, was the speaker at the exercises for Jefferson Medical College and those for the College of Graduate Studies. *Lt. Col. Guion S. Bluford* was the speaker for College of Allied Health Sciences exercises. At the commencement exercises *Sidney Weinhouse, Ph.D.,* emeritus professor of biochemistry at Temple University, *Francis C. Wood, M.D.,* emeritus professor of medicine at the Univeristy of Pennsylvania, and *Darrel J. Mase, Ph.D.,* dean emeritus of the College of Medicine of the University of Florida, were awarded honorary degrees.

Joseph L. Seltzer, M.D., has been named chairman of the Department of Anaesthesiology.

Assisted by an advisory board of 50 members, *Frederick B. Wagner, Jr., M.D.*, has undertaken a history of Thomas Jefferson University.

Philadelphia College of Osteopathic Medicine. The Chinese Medical Association and the Citizen Ambassador Program of People to People International have invited *Domenic A. DeBias, Ph.D.*, professor and chairman of the Department of Physiology and Pharmacology, to visit the People's Republic of China. Dr. DeBias will make the trip with a group of medical educators from Canada and the United States.

On June 3, 205 physicians received their D.O. degrees at graduation ceremonies in the Academy of Music.

In May *Nicholas S. Nicholas, D.O.*, chairman of the Department of Osteopathic Principles and Practice, was inducted into the Delaware County Chapter of the Pennsylvania Sports Hall of Fame. Dr. Nicholas is an authority on sports medicine.

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Authors should submit two copies, typed on one side of 8½ by 11 inch paper; all material, including quotations and references, should be double-spaced. A short summary of the paper should also be included. *Transactions & Studies* accepts either footnotes or references, but either must be in accordance with the guidelines in *A Manual of Style* (Chicago: University of Chicago Press, 1969), 12th edition. Prospective authors are encouraged to examine back issues of *Transactions & Studies* to familiarize themselves with the format of the journal.

Photographs and other illustrations may be included. Tables must be typewritten on separate sheets; they should be prepared professionally before submission.

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John H. Gibbon, Jr.: The Heart-Lung Machine and Progress in Cardiovascular Surgery

HARRIS B SHUMACKER, JR.

SUMMARY: A personal appraisal of John H. Gibbon, Jr. and his heart-lung machine, the influence this device and open heart surgery have had on the progress of cardiovascular surgery and the importance of the construction and preservation in the Mütter Museum of a model of the apparatus Dr. Gibbon used in the first successful intracardiac operation performed with the aid of total cardiopulmonary bypass.

It is a treasured privilege to participate in an event honoring a dear friend, a great man and a fruitful life. There is so much in this building that recalls John Gibbon's heritage, his family and friendships and his work. It was in Philadelphia that he was born on September 29, 1903, the fifth in a line of American doctors going back to 1684. He was educated and, except for two years of stimulating fellowship in Boston and army duty overseas, he lived his days in this city. Here he performed the historic operation in May 1953 that crowned years of research. Close by he served with distinction as Samuel D. Gross Professor of Surgery at Thomas Jefferson University, and in this very hall he presided over the affairs of the College of Physicians of Philadelphia as his father did before him. In its Mütter Museum, for all to see, we unveil a model of his dream.

THE model of the heart-lung machine comes to the Mütter Museum of the College of Physicians of Philadelphia through the generosity of the Joseph N. Pew Memorial Trust and the International Business Machines Corporation which had played such a significant role in its development. Dr. Gibbon and his helpers struggled for years to construct various types of pump-oxygenators with inadequate support until Mr. Thomas Watson and IBM came to their rescue with funds and technical skill. Success was not slow in coming. The final result was the historic device, a model of which was unveiled today. When Dr. Lewis Coriell, Chairman of the Museum Committee and Mr. William Chaveas, Executive Director, approached IBM with the idea of the model and an estimate of its cost they received a most generous response. Mr. Everett Van Heusen, President of the corporation's information records division,

Dr. Shumacker is Professor and Senior Advisor in the Department of Surgery of the Edward Hebert School of Medicine, Uniformed Services University of the Health Sciences. This paper was presented as the Mary Scott Newbold Lecture at the October 3, 1984 College Night when a model of the Gibbon Heart-Lung Machine was presented to the College.

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informed them that the company would not only see that the model was constructed but would also make a substantial financial contribution. The check to help defray the cost was delivered on August 26, 1980; it has taken four years to build the model and to arrange the exhibit, with generous help from the staff at Jefferson. Mr. Donald Rex, who was appointed the intermediary between the company and the College, recommended a South Florida model maker with whom the College entered into a contract. Mr. Rex was forced to begin with a set of drawings taken from old photographs since the originals were in Copenhagen in the hands of Dr. Hans Engel to whom Gibbon had given them. Engel had kept them in excellent condition and brought them to this country and to the Thomas Jefferson University (which rightfully was anxious for them) where they could be kept safely. Copies of the set reached Mr. Rex late in his project, to be sure, but in time for the final drawings. After many months of hard work, construction of the full scale model was completed. In the Mütter Museum it will be available now and throughout the years to come, to be viewed by all who are interested in what man's ingenuity can do to restore health and add years of useful life to those crippled by cogenital malformations and acquired disease.

How did this important contribution have its beginning? Dr. Gibbon, whose ambitions in earlier years had vacillated between writing poetry and becoming a surgeon, had graduated from Jefferson and was serving his internship at the Pennsylvania Hospital. While he was helping Dr. Joseph Hayman try to learn whether severely hypertensive patients might respond differently to diets containing either potassium chloride or sodium chloride, Gibbon suddenly and excitedly awoke to the startling realization that research has the capability of producing valuable new knowledge. After thinking about the matter and talking it over with Dr. John Flick and with his father, he decided that he would like an opportunity of working in a research laboratory and learning whether he had any talent in this field. This led to a fellowship with Dr. Edward ("Pete") Churchill in Boston beginning in the winter of 1930. It was a splendid year indeed, one during which there occurred events which gave his life happiness and fulfillment. He married Mary Hopkinson, Churchill's technician; he had an idea and his research was succeeding. One event touched him deeply: the postoperative development of a massive pulmonary embolism in a patient whose condition then began to rapidly deteriorate. She was moved to an operating

room. Gibbon was given the responsibility of observing her and recording her pulse, blood pressure, and respiratory rate every fifteen minutes. His assignment began at three in the afternoon and ended at eight the next morning when she ceased to breath and her blood pressure fell to zero. Dr. Churchill operated immediately and rapidly removed the embolus, but she did not survive the procedure. Gibbon more than once talked about his thoughts that night but never expressed them better or more succinctly than in the last address he delivered, just three months before his death. This is what he said:

> During that long night's vigil, watching the patient struggle for life, the thought naturally occurred to me that the patient's life might be saved if some of the blue blood in her veins could be continuously withdrawn into an extracorporeal blood circuit, exposed to an atmosphere of oxygen, and then returned to the patient by way of a systemic artery in a central direction. Thus some of the patient's cardiorespiratory functions might be temporarily performed by the extracorporeal blood circuit while the massive embolus was surgically removed.[1]

During the next three years while he was practicing surgery and carrying out other investigations in Philadelphia the idea haunted him. He had to give it a try. He received little or no encouragement from those with whom he discussed his proposed investigation, but Churchill offered him another fellowship and his wife a part-time position as his technical helper. Those who have only in recent times worked in research laboratories well supplied with funds, personnel, and supplies, including electronic apparatus for measuring various vital functions, must have difficulty imagining what conditions were like in those days. Dr. Gibbon described them in part:

> Imagine for a moment the way research was carried on in a research laboratory in the 1930s. The Federal government was not then pouring out hundreds of millions of dollars to doctors to perform research. Harvard provided my fellowship and the Massachusetts General Hospital provided the laboratory. I bought an air pump in a second hand shop in East Boston for a few dollars, and used it to activate finger cot blood pumps. Valves were made from solid rubber corks with the small end cut transversely three quarters through to form a flap about 2mm. thick. With this flap held up, a cork borer was passed longitudinally through the center of the rubber stopper, thus creating a channel for the stream of blood. These simple valves worked well. Plastic materials were not available, so our circuit was largely rubber and glass.[1]

His wife, Mary Hopkinson Gibbon, in her "Recollections," added more:

> To do these experiments we had to be at the laboratory bright and early, as they often continued all that day and sometimes well into the evening. We could only manage about three such experiments a week. First we had to smoke a kymograph record and get it in place on the operating table. Then we had to bring a cat down to the laboratory from its upstairs quarters and anesthetize it . . . perform a tracheotomy and connect up the animal up to artificial respiration while a "Drinker-Heart-Preparation" was done . . . These preparations usually took four or five hours and it was mid-afternoon before we were ready to start the real critical part of the experiment . . . [2]

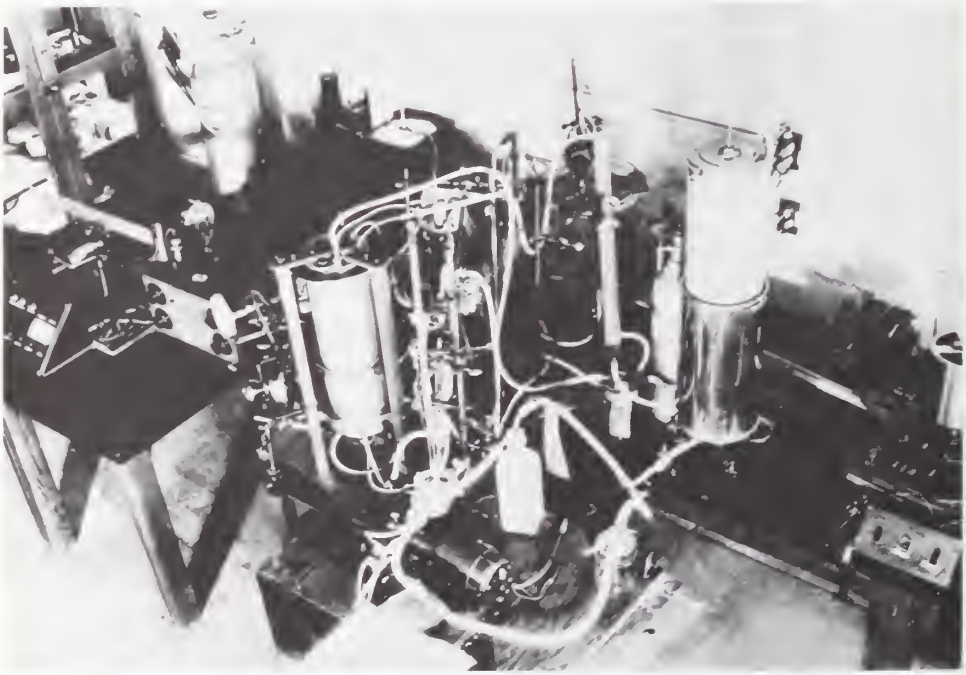

Figure 1. The original heart-lung machine, first used successfully in 1935 on a cat while Dr. Gibbon was on a fellowship at Harvard.

Anticipating that the oxygenation of blood would prove to be the most difficult part of the work, Gibbon read all the published pertinent material he could find. His first model consisted of a rotating cylinder on the top of which there was introduced a stream of blood which flowed down alongside the inner surface as a thin film, and where it was bathed in a gaseous mixture from which it took up oxygen and discharged carbon dioxide. The oxygenated blood was collected at the

Figure 2. Larger, vertical, revolving-cylinder oxygenator and control equipment for use on animals. (From J. Gibbon, Extracorporeal Maintenance of Cardiorespiratory Functions. In *Harvey Lectures* 1957-58. 53:207, by permission.)

bottom and pumped back into the animal through an artery. Numerous problems were encountered, such as the choice of anesthesia, maintaining a continuous flow of venous blood from the cat, and avoiding the blood loss to the animal. All were eventually solved. During the first year it was possible to show that the rather crude heart-lung device was capable not only of maintaining part of the functions of the heart and lung during a period when the pulmonary artery was almost totally occluded, but also of taking over the cardiorespiratory functions completely while

the pulmonary artery was closed off. Of great importance and encouragement was the ability of the animal later to resume these functions on its own. This represented remarkable progress for such a short time. One interesting aspect of this initial work was the priming of the apparatus with physiologic saline solution to which was added six percent gum acacia, the only suitable material then available for increasing the osmolarity of the saline solution. For years after the heart-lung machine was demonstrated to be clinically feasible it was customary to prime it with blood—with all the attendant difficulties of procurement—before returning to various non-blood solutions similar to the one used at the very beginning of these experiments.

After the Gibbons returned to Philadelphia and Jack to the practice of surgery, the work continued at the School of Medicine of the University of Pennsylvania in the Harrison Department of Surgical Research until it was interrupted by World War II. During these five years it was possible to obtain increasingly better results, so that he was able to report to the American Association for Thoracic Surgery in 1939 that an improved version of the original machine was capable of assuming the entire work of heart and lungs for periods of time ranging from twelve to twenty minutes and with prolonged survival of the cats. In discussing this breakthrough, Leo Eloesser said that he was reminded of the visionary tales of Jules Verne, stories of advances thought to be entirely fanciful but subsequently realized.[3] It will be recalled that Gibbon had started the project with the objective of rendering the operative removal of pulmonary emboli safer, an objective that was subsequently accomplished. Soon, however, he had come to appreciate the fact that if the device should reach the stage of clinical applicability it would permit the performance of many additional cardiac surgical procedures, and on this occasion he said in his customary unassuming fashion:

> ...it is conceivable that a diseased mitral valve might be exposed to surgical approach under direct vision and that the fields of cardiac and thoracic surgery might be broadened.[4]

It was natural that Gibbon should volunteer for military service. His grandfather, Lieutenant General Samuel Young, made an outstanding record during the Civil and the Spanish-American Wars and, among other honors, was the first president of the Army War College. His father, who served with distinction during World War I, was consultant

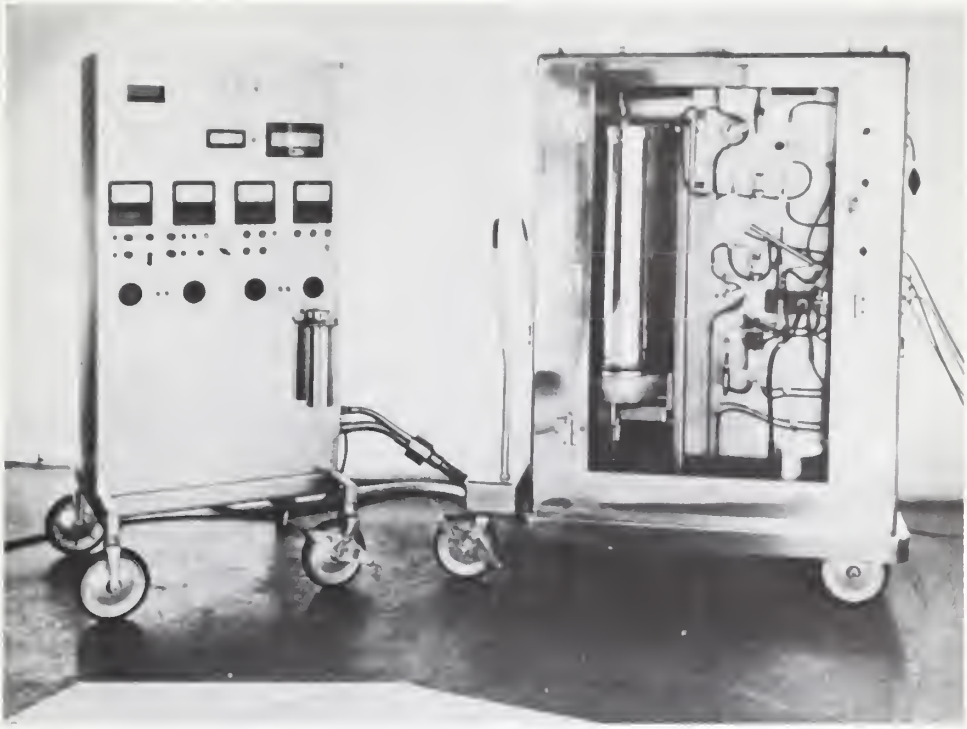

Figure 3. The first IBM machine, "The Queen Mary"—last vertical, revolving cylinder-type of heart-lung machine which had a refrigerated cabinet and was used on dogs. The control cabinet is on the left. (T. L. Stokes and J. Gibbon, Jr. Experimental Maintenance of Life... . In *Surg, Gyn & Ob.* 1950 91:138, by permission.)

in surgery to the American Expeditionary Forces and surgical consultant to the American hospitals in Great Britain. When John Gibbon, Jr., returned to Philadelphia after World War II, he was appointed Assistant Professor of Surgery at the University of Pennsylvania and, a few months afterward, Professor and Director of Surgical Research at Jefferson. Ten years later he became the Samuel D. Gross Professor of Surgery and Chairman of his Department. The work with the heart-lung machine was resumed at Jefferson with the same dedication that had characterized the earlier work.

His great chance came during Christmas vacation in 1946 when he met Mr. Thomas Watson, chairman of the board of IBM. IBM was willing to lend a hand and Gibbon was much in need of its engineering talent. Characteristic of Doctor Gibbon was his insistence upon an arrangement whereby neither he nor IBM should profit financially from the result of their working together. The project gained speed. A machine with a larger revolving cylinder was constructed. Although

capable of improved oxygenation, it was not adequate for large dogs and obviously would never do for human beings. At this time two of Jack's residents, T. L. Stokes and J. B. Flick, Jr., added a critical modification; they lined the cylinder with a screen that greatly increased the oxygenation of the film of blood as it passed down over it. It was a natural step to study the oxygenating capacity of stainless steel screens varying both in the diameter of the wire and of the apertures in the mesh. The ultimate result was a device in which the oxygenator consisted of a number of flat screens placed vertically next to one another. Other changes were made in the unit and it was finally ready.

Miss Cecelia Bavolek, eighteen years old, had been admitted to Jefferson Hospital three times in six months for heart failure. Cardiac catheterization studies had revealed a large atrial septal defect through which nine liters of blood per minute were shunted from left to right. In an operation on May 6, 1953, the machine took over her heart and lung functions completely for twenty-six minutes during which the defect was clearly seen and closed by suture. She had a smooth recovery and a catheterization study in July proved the defect to have been completely obliterated. With this successful procedure using an extracorporeal heart-lung substitute a new era in thoracic surgery was ushered in.

What had been accomplished besides another historic "first"? Whenever a new discovery is made, the chances are great that it will have an impact upon areas well beyond that of its immediate goal. Gibbon's heart-lung device did far more than bring practically all disorders of the heart into the realm of operative cure or pallitation. Indeed, it did much more than I can adequately describe. As advances directly or indirectly related to the advent of the Gibbon machine are mentioned, it should be kept in mind that this report is a tribute to John Gibbon, to his idea, and to what came from his effort. It is in no sense a meticulously referenced and complete review of progress in cardiac surgery and related fields. Hence, there will be no specific mention of those individuals who brought about advancement, nor will I include a discussion of all the new knowledge, techniques, methods and improvements in patient care that in one way or another derive from the heart-lung machine. Those that are covered will illustrate the variety and importance of these contributions.

Gibbon fully realized that the apparatus he developed was not the ultimate; that improved, more easily manageable ones would be forthcoming, and that his own would likely cease to be used at some

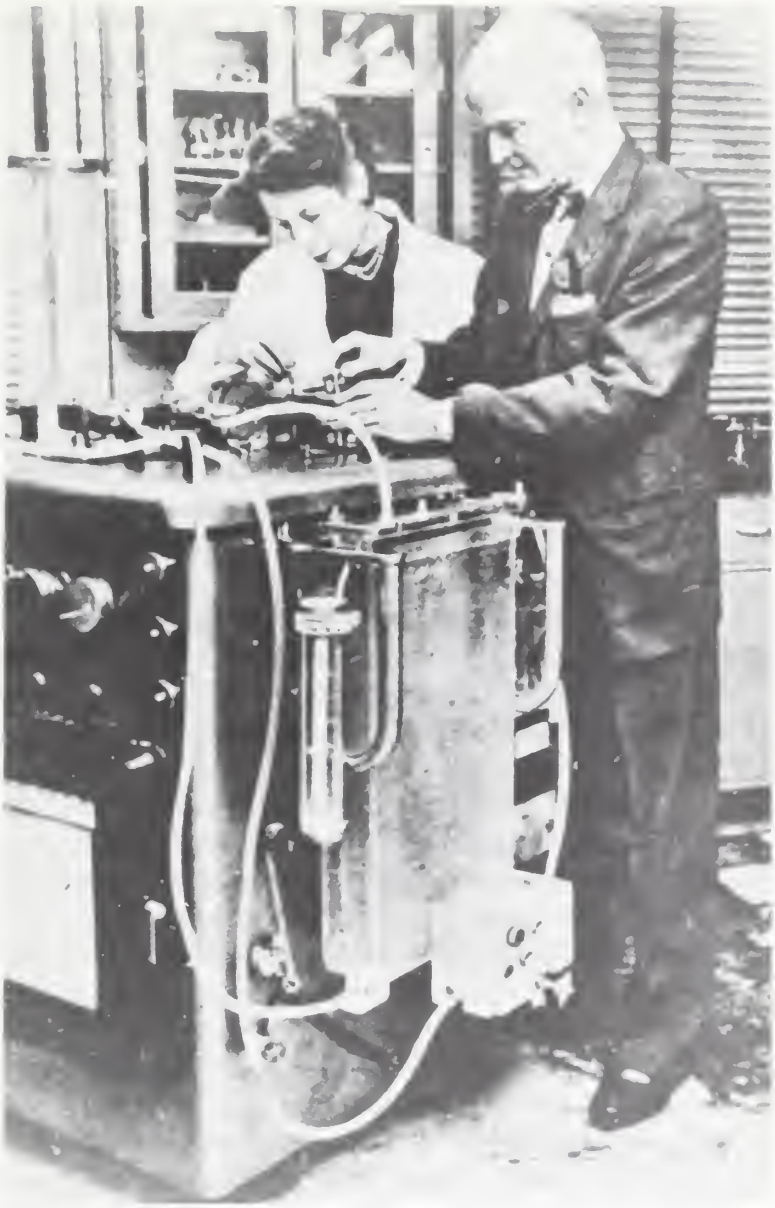

Figure 4. Photograph of Dr. and Mrs. John H. Gibbon examining one of the later heart-lung machines used on animals. The enlarged screen filter is visible on the right side of the machine.

time in the future. Some of his friends and acquaintances had already been working upon heart-lung machines of similar and different designs. Many of them, likely all of them, had been inspired to undertake these projects as the result of Gibbon's work and his earlier successes with animal studies. Rotating disc oxygenators were produced and enjoyed wide usage for a while. Membrane gas exchangers were devised, modified, steadily improved, and were adopted in numerous institutions. Bubbling oxygen through the blood, the method used by physiologists before surgeons dreamed of the heart-lung machine, was rendered so workable by the introduction of appropriate antifoaming material and special filters that the bubble oxygenator became the most widely used of all. The labor involved in cleaning and sterilizing parts led to disposable units of various sorts. As control of body temperature became a more prominent feature of cardiopulmonary bypass, better heating and cooling devices were incorporated. The Gibbon vertical screen oxygenator was abandoned in favor of others some time ago. In no way does this detract from its importance; it led the way. Furthermore, after Gibbon's successful operation, an apparatus almost exactly like his own was employed with such ingenuity by Dr. John Kirklin and his colleagues at the Mayo Clinic that one cardiac anomaly after another was shown to be reparable and, more than anything, emphasized that Gibbon's contribution had indeed marked the beginning of a new era in the management of disorders of the heart. Before long a heart-lung machine was an essential feature of all tertiary referral centers.

During the thirty-one years since May 1953 almost all the congenital and acquired abnormalities of the heart and great vessels that cannot be well managed by medical therapy have moved into the area of operative treatment. In addition, the same device employed for surgery of the heart has proven most useful in supplying circulatory support to certain areas that would otherwise be deprived of it by some necessary operative manipulation. The technique is becoming of increasing help in combination with hypothermia when lesions in various segments of the body can be handled with greater safety and likelihood of cure during a period of circulatory arrest.

The capability of operating in a precise, unhurried manner inside the heart as well as on its surface increased the demand for accurate anatomic and physiologic understanding of both the disordered and the normal heart. Before undertaking such procedures one had to know exactly what was abnormal, just what needed to be corrected, and how it

could be best accomplished. To be sure, much was already known, but much more was necessary. The usefulness of methods employed for fairly long periods of time had to be reviewed; fluoroscopic and radiologic examination of the heart and cardiac catheterization, had to be improved and the data they yielded had to become more exact. Other means of evaluation had to be improved or developed—among them, ultrasonography, coronary arteriography, isotopic visualization of the heart in motion, various tests to learn how the heart behaved under stress as well as at rest, ways of measuring the effectiveness of cardiac contractions—to mention a few. Study of the metabolic activity of the myocardium and of protecting it as well as possible under differing circumstances became important. Better ways of calculating cardiac and other vital functions and for recording them continuously, if possible, assumed a new importance. The desire of the cardiac surgeon and the cardiologist for ever-improving the means of cardiac assessment was, and remains, insatiable.

It should be remembered that the operations which had been carried out before May 1953 had been extracardiac procedures, blind intracardiac manipulations, and intracardiac repairs that could be accomplished within a few hurried minutes during venous inflow occlusion. The interior of the heart in living subjects was, for all practical purposes, an unexplored area. Now that it could be clearly scrutinized, the correction of a variety of abnormalities became an all-absorbing challenge. This challenge raised important questions. Should septal defects be closed by suture approximation or with a patch? What sort of patch was better— one made from the patient's pericardium or atrial wall, or one made of a plastic material? No valve substitutes were available at the beginning. Could they be constructed? When they became available, which were preferable—homogous fresh or preserved valves, valves constructed of the patient's own fascia lata or pericardium, preserved heterologous stented valves harvested from swine or made from pericardium, one of the numerous manufactured prosthetic valves differing in design and in materials utilized? Should the choice be dependent upon which valve had to be replaced? Should it be related to the patient's age? Should the procedure be carried out with the heart beating or arrested? How could one best protect the heart and the other body organs during the period of cardiopulmonary bypass? What was the least hazardous and most effective way of operating upon small

infants? How were diseased coronary arteries best bypassed? Many other questions needed answers, many remain unanswered, and new ones arise almost daily.

It is unlikely that any other surgical advance has done more than the heart-lung machine to make surgeons realize the importance of the numerous physiopathologic changes which may be associated with the disorders they treat and with the operative procedures they carry out for this purpose. It has had a stimulating role in the search for a better understanding of normal and abnormal bleeding and coagulation factors, disturbances of renal function, body water and electrolyte difficulties, and a host of other issues. It has done much to make surgeons the excellent physicians they should be and to nurture the spirit of medical teamwork.

For half a dozen years or more after the era of open heart surgery began, there were no specialized postoperative intensive care units for patients who had undergone such operations. These facilities, supplied with equipment for monitoring continously, or at frequent intervals, most of the important vital functions; and with adequate personnel especially trained for their duties have added immensely to the likelihood of a successful outcome.

Thus far we have dealt with matters which have supplied the surgeon with more precise information about a patient and especially his heart, so that one could comprehend thoroughly the problems one faced, could plan and carry out more effectively what was needed, before, during and after an operation, and accordingly could give a patient the best chance for a good result. A further word about the procedure itself needs emphasis. For the best result the operation itself must not only be planned well, but must be performed in a gentle, precise, skillful manner without a moment's waste of time. The heart-lung machine and open heart surgery have thus emphasized the importance of those features which should characterize all operative procedures.

Everyone who is or has been associated with medical education or training has harbored the aspiration that those whom he has helped to reach their professional maturity would be understanding and compassionate as well as skilled doctors. As with most high aims, this one has not been universally achieved. Nothing in the recent past, however, has been of more assistance in making this a practical reality than Dr. Gibbon's device for extracorporeal cardiopulmonary bypass. Patients have a special interest in their hearts; each wants to know precisely his

doctor's opinion about his own. The cardiac surgeon realizes this well and also the concern shared by a patient's family and friends. He can take no shortcuts. He must demonstrate his feeling for all of them and must, to the best of his ability, gently, kindly and honestly let them know what the various examinations and tests have demonstrated to be the actual situation, why the operation is proposed, its risks and what he hopes it will accomplish. A patient must be made to understand that the choice is his own. Rarely does his decision differ from that of his cardiologist and his surgeon, but it is important that he be active in the decision-making process.

What is the message of the heart-lung machine? It is complex and important. It emphasizes the importance of research. It makes it evident that medical progress does not arise *de novo* out of thin air and makes it clear that animal research is a necessity, that almost all new ideas and inventions must, if possible, be carefully assessed in an experimental laboratory before being tried in man. It brings into broad daylight the necessity for such laboratories and for their support. It confirms what has been known for centuries regarding the value of carefully performed autopsy studies; the exact anatomy of the heart, normal and in all its malformed states had to be learned in this way. One cannot do an exploratory operation upon the heart; it must be a planned procedure.

What lies ahead? Who can tell? More perfect heart-lung machines will likely be developed. Better valve substitutes will probably be forthcoming. New heart operations will be devised and improvements made upon some currently in use. Some will become unnecessary as we learn to prevent the occurrence of certain cardiac diseases, and perhaps even some of the congenital malformations as well. The technique of total extracorporeal cardiopulmonary bypass will undoubtedly find further usefulness in operative procedures other than those upon the heart.

Homograft replacement of the irreparably damaged heart will become more successful with respect to safety and length of survival as new drugs are produced which are more effective in preventing rejection and in lessening the danger of disastrous infection. Their utility will, however, always be restricted, as Dr. Gibbon fully realized, because the availability of supply of donor hearts will never be adequate to meet demands. Nearly twenty years ago when he was delivering his presidential address before the Society for Vascular Surgery, Jack spoke

with some optimism about the totally implantable mechanical heart. This theme struck a hopeful chord. He recognized the difficulties, but he also knew that hard work and original and clear thinking could solve many problems. The few of us then working upon this project were making progress but circumstances beyond control brought the effort to a halt. During the ensuing decades investigators have learned much. They have, however, concentrated upon devices only partially intracorporeal and activated by large power units outside the body, a design which Gibbon predicted would never prove to be a satisfactory substitute. He would be happy to know that at long last a serious effort and with a promising start is again underway to develop the apparatus about which he spoke, the totally implantable mechanical heart. If Dr. Gibbon could produce a workable heart-lung machine is it not possible that this dream may also become a reality?

It has not been my intention to imply that the heart-lung machine and its successful clinical use are solely responsible for all the good things that have been discussed. If no heart-lung device had ever been conceived or made, and heart surgery were today no farther along than it was in the thirties and forties, many of the other advances might eventually have been made. Nevertheless, it is perfectly evident that no single contribution in our lifetime has had a more far-reaching influence upon medical progress than has the Gibbon machine. In my opinion it is indeed the surgical contribution of our era. How fitting it is that it should be visibly immortalized in the Mütter Museum of this great College of Physicians of Philadelphia just as it looked on May 6, 1953 when Jack Gibbon used it successfully to close the atrial septal defect in Cecelia Bavolek's sick heart and make open heart surgery a practical and life saving reality.

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Reminiscences of an American Pioneer in Experimental Medicine

I HAD been elected president of the College of Physicians of Philadelphia while absent in Egypt. The first official act after I took office was an address in which I demonstrated the necessity of an increase of the size of the building for the College, if the College were to prosper and the Library to be maintained... The College agreed as to the necessity for the new building, but four years of constant parliamentary battle were necessary to get concord as the the proposed site. The money for the building was collected by a committee, and especially by Dr. S. Weir Mitchell, including the one hundred thousand dollars which he obtained for Dr. Carnegie; and when the College was finally built all the Fellows were apparently well satisfied.

Horatio C Wood, M.D., "Reminiscences of an American Pioneer in Experimental Medicine," *Transactions and Studies of the College of Physicians of Philadelphia* (1920), page 45

Life's Equities After 65*

W. FERGUSON ANDERSON

SUMMARY: The reflections of an inquiring and serene mind on the compensations of maturity and the deflection of decrepitude.

TO be a specimen of the "over seventies" and to present the rewards of survival as a prize which one has already gained must be an unique experience.

While some of the observations here presented are my own, due tribute must be paid to my gifted teachers. Perhaps I should explain why an elderly Scotsman has come to this great city of Philadelphia to present the sunny side of aging. The following verse by A. Robert Rogers gives my reasons:

To bend men's thoughts beneath my will
as gentle wind can sway the trees;
and not with that impassioned ease of fiery rhetoric
which liars use,
but in the triumph of the mind
to excavate some buried truth
and fling it polished to mankind

Life can begin at seventy; so many years ago Maurice Chevalier is reputed to have said, "Old age is not so bad when you consider the alternative." My own interest in this subject started in 1937 from my work with Professor Noah Morris in Glasgow. This eminent physician gave a lecture in 1942 entitled "De Senectute," and as he quoted briefly from my own research I have borrowed extensively from his oration.[1]

The WHO classification of older people sets the scene;[2] it defines the elderly as aged 60–74 years, and this now could be reasonably changed

Sir W. Ferguson Anderson is Emeritus David Cargill Professor of Geriatric Medicine of the University of Glasgow, Scotland. This paper was presented June 27, 1984 at the Forum on Aging of the Section on Geriatrics and Gerontology of the College of Physicians of Philadelphia.

**The title, "Life's Equities after 65," was selected by the Section Chair, Joseph T. Freeman, M.D., as the topic for Dr. Anderson's paper.*

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to an upper limit of 79. The aged are 75 years and over, and these figures in our modern society could well be 80 years and over with the proviso that chronological age is almost meaningless and that many individuals are extremely fit until over 90. In the report of this WHO meeting it was stated that the needs of the elderly, namely, occupation, interests, and hobbies, use of acquired skills, and knowledge, are different from those of the aged who begin to require care, help, and services.

Bernard Shaw's last play was produced when he was in his late eighties, and he was vigorously productive until his death at 94 years. In his *Back to Methuselah* he had no doubt that in the first hundred years of a man's life he is infantile in outlook and only by prolonging life will the individual gain sufficient sense to contribute significantly to the progress of humanity. Benjamin Disraeli stated that many men of genius had no old age.

The change in the behavior, customs, and dress of older people in the last fifty years has been dramatic and is often not yet understood by physicians. In my own unit robust encouragement was given to young doctors to take part in an out-patient clinic for older people who were healthy or nearly healthy, where the endeavor was made to prevent illness and disability. The idea in asking the doctors to attend was that the practicing physician should build up knowledge of the clinical picture of an active, healthy elderly person. This information seemed essential for any doctor attempting to treat older ill people. If this is not done, physicians who deal predominantly with the elderly may have the impression that all old people are ill or depressed. They may also attempt to treat physiological changes which accompany aging as if they were pathological. The doctors did not appreciate this work—it was regarded as a waste of time. To me it has always seemed important to realize what older people can do. As I examined an attractive lady of 72 at this clinic in 1953, she suddenly sat up and said: "Please hurry up, doctor, I am due on the first tee at 2 o'clock." While examining apparently healthy older people, N.R. Cowan and I were fascinated by the wide variation in their levels of blood pressure.[3] It was also possible to demonstrate by simple means that in the community some older individuals were healthier than the healthy—these were the gerontocrats.[4]

Aging is the most wonderful example of natural adaptation to changing physical attributes, mainly of wear and tear. It would be foolish to pretend that older people are the same as the young; the two great changes as the individual adapts to increasing age are loss of

elasticity and loss of reserve in individual organs. Elasticity diminishes in skin, bone, arteries, lungs, and brain, while loss of reserve function occurs in the heart, liver, lungs, kidneys, and brain. However, a person of 90 years in health could feel as fit as an individual of 45. A recent survey of eyesight in Scotland of over 2,600 people aged 65 and over showed that if changes correctible by prescription lenses were considered normal, 90% of the individuals examined had normal vision. It was only after the age of 85 that vision started to fail. Thus, if routine eye examination is undertaken, the chances of going blind are minimal.[5] In other words, if you look after your eyes they will look after you.

Postural sense does deteriorate, and if you watch a good actor imitate an old person you will note that he walks on a wide base. In contrast, watch a youngster change into a bathing costume on a beach—standing on one leg for a few seconds presents no problem. It is said that the first sign of postural deficit is when you have to sit down to put your trousers on. Because of this impaired postural sense, older people must be more careful; otherwise falls do occur. This is no problem for many well-dressed Englishmen who carry a rolled umbrella; they find it becomes very useful to their postural control when they reach 90. (Many people will accept the use of an umbrella when they will not take kindly to carrying a stick.) I wish not to devote much time to discussing physical attributes but rather to the endeavor to change the public attitude toward the older citizen. The concept held by members of the public of a steady and rapid decline in body and mind is also associated with the idea of inactivity—watching the world go by. My wife, still a tennis enthusiast, went into a sports shop to purchase a new racquet. As the assistant approached, my wife said, "I want to buy a new racquet." The shop assistant, knowing her, said, "For which of your grandchildren?" Annoyed, my wife explained that both she and I still play tennis.

Today older people are taking much more pride in their appearance and, contrary to the view of the young, the healthy elderly man or woman does not change in interest in the opposite sex. The acrobatic mechanics of sex in older people have been well described by others; I wish to speak about love and affection. Many previously happily married couples lose one partner by bereavement and even in 1969, McKain, writing about retirement marriages, concluded that the final element in predicting the success of such marriages depended upon the personality of the bride and groom.[6] These older people marry not only because they are lonely but because they are in love. Like other

members of society, the elderly crave affection. Men and women have so much to live for and so much to give each other even when they are no longer young; for some, life does begin after 70.

Bertrand Russell died at age 98 and summarized his philosophy thus: I have had three passions, simple but overwhelmingly strong; the longing for love, the search for knowledge, and unbearable pity for the suffering of mankind. When he was over 90, it is said that a young reporter spotted him and went up and asked him, "Sir, you are a distinguished and learned philosopher. Tell me, looking back on your life's experiences, what do you think of sex?" There was a long pause. The great man looked wistfully into the distance and then he murmured quietly, "I like it."

The importance of realizing that you will almost certainly live longer than you plan must always be kept in mind. Eubie Blake said once in a sad moment, "If I had known I was gonna live so long I'd have taken better care of myself." The physicians who know how long their older patients are going to live are few and far between. Prognosis in the elderly is extremely difficult. From studies of people who have already reached the age of 70 and who were followed until they died, it was almost impossible to discover any attribute which was an accurate predictor of longevity. It was concluded that the older one is the more likely it is that one will die.[7] Average expectation of life at birth is increasing all the time.

Most illnesses in old people are, as in the young, remediable; the old are built of good material and have a tendency to recover. "Modern medical practice cannot guarantee a healthy old age and many people arrive there in such a shoddy, patched up state that it is a misery to be there." These words were not written by a physician but by a scientist interested in aging.[8]

What can be done to make old age a prize worth training for? How can individuals be persuaded not to smoke, to remain thin, and to be sensible in their intake of alcohol? The answer to this must rest with society in that if our regard for older citizens is such that we give them no real place in society, no target for the use of their skills and knowledge, then there is no reward for remaining fit except for those with the perception to realize that in any country with state input to health and welfare, keeping healthy saves one's fellow citizens money. In the U.S.A. it has been demonstrated that preventive measures certainly can cut the incidence of heart attacks.

In the United States legislation has been passed, as I understand, against ageism; and while visiting Canada I was informed of the success of such legislation in New Brunswick. This is a massive step in the right direction. Looking over the great achievements of so many wonderful giants like Titian, Michaelangelo, Voltaire, Harvey, and Paget leaves the strong impression that mental achievement favors the preservation of bodily functions and leads to a happier old age. Perhaps Cicero was right when he wrote so many years ago, "Old men should be particularly careful not to languish out their days in unprofitable idleness: it is our duty to resist old age, to compensate for its defects by a watchful care, to fight against it as we would fight against disease, to cultivate the principles and the practices of the virtues, for in truth it is our own vices and their own faults that fools charge to old age."[9]

It can be said that some old people are socially useless but it is possible that age has merely prolonged a previous uselessness. As an American writer remarked upon one of his aged seniors,"Professor X died in the full vigour of his incapacity." One of my friends, John Stewart, is now 84, but he retired at 65 determined to help his fellow pensioners. He had read Dr. Snellgrove's report on the employment of the elderly.[10] This inspired him to return to his home town of Glasgow, where he contacted the Glasgow Retirement Council. At that time the Council was organizing courses in preparation for retirement. He requested the use of an office for five afternoons per week and established a bureau for the re-employment of retired people who desired part-time, paid employment. This office was staffed entirely by elderly volunteers and was opened in 1967. Since then 3,450 jobs have been filled with some amazing success stories. A surveyor requested someone to act as an office boy but he wanted a person with previous experience of working in such an office. There was a retired surveyor on the register of the bureau and he was contacted and asked if he knew of anyone who could take this job. In spite of his wife's misgivings, the man said that he would take the post himself. A year later a routine enquiry was made by the re-employment bureau and the man was asked if he was still employed in the same job. He replied "Not exactly. I am now a partner in the firm." It generally is agreed that continued employment has an association with longevity. Palmore and Stone stated that continued work satisfaction may operate at three levels to increase longevity.[11] On the physical level, work usually provides

regular exercise; on the mental level, it gives cognitive satisfaction; and on the social level, status, satisfaction, and social integration.

There is an old Scottish saying that a change is as good as a rest and perhaps occasionally better. By this I am alluding to a change of occupation. A successful lawyer, Ronald Morris retired from full-time work at the age of 60 and began to walk the countryside. Conversing one day with a farmer, he became interested in the story of some ancient carvings on a stone which the farmer said he had seen as a boy but which were now buried. After some fascinating experiences, my friend the lawyer, now 81, has written three books on prehistoric rock carvings of 1600–2000 B.C., has broadcast frequently, has appeared on television, and now is a recognized world authority on the subject. Visiting him and his wife, who also is an archeologist, I found him in excellent health, one might say, "burrowing away." This story bears out a saying of Confucius: "Until a man is thirty he is like the ivy or vine, with no inherent strength; at forty he is a bare tree; at fifty he puts forth leaves; at seventy fruit."

My friend, Sir Charles Illingworth, a doyen of surgeons and founder of a dynasty, now in his mid-eighties, recounts that one of his grandchildren, after talking to him, rushed out to tell his mother, "Daddy is clever but Grandpapa is a genius." There is a special rapport between the young and the old, making grandparents an added dimension to the family unit.

Lest it be thought that only men preserve their physical and mental health, Lilian Hertzberg reminded us of Mary Scharlieb who spent her early married life in India. Shocked by the lack of female doctors to help Hindu and Moslem women, she became the first woman to become an M.D. of London University and still was operating at age 83. In passing, it is worth recording that the Prince of Wales, when President of the British Medical Association, reminded the Association of the need to train doctors for such groups of people.

Perhaps the greatest change in the habits of older people has been in the realization of the benefits of exercise. Fentem and Brassey have demonstrated that the exercise capacity of older people can be improved by training and that an exercise program prevented any deterioration in physical abilities over a ten-year period in individuals of both sexes aged 51 to 71 at the beginning of the program.[12] If consideration is given to taking more exercise, and this entails a complete change of life style, then a medical examination should be contemplated. There should be a

gradual transition to a level of exercise which suits the individual, with enjoyment of the particular exercise as the most important motivation.

Work at the Rutherglen Consultative Health Centre, where an effort was made to keep older people fit, resulted in the conclusion that a complete physical examination was a great stimulus to the morale of the elderly.[13] Periodic health checks in middle-age are of somewhat doubtful value, and a Canadian Task Force recommended for the prenatal, childhood, and advanced age phases a specific, age-related schedule, with examinations carried out at stated intervals; for other age groups health protection packages could be offered in conjunction with occasions when the individual seeks medical care.[14] Many of the procedures recommended could be carried out at least in part by allied health personnel. Other methods of early ascertainment of illness include home visits by community nurses (health visitors) to selected age groups (e.g., the 75s and over), postal surveys, or pre-arranged visits by doctors.[15]

Williamson and his colleagues[16] described the iceberg of unreported illness, but Smith, writing in 1676 on *The Pourtract of Old Age,* stated "The reasons why persons in this age fall so soon into this decrepit state and why the miseries are multiplied and magnified upon them is because either they call not in soon enough for help or because those that are called in either understand not, or mind not what they ought to do."[17]

Preventive geriatric medicine is exciting and constant attempts must be made to strengthen the morale of the elderly and to reveal to them their learning possibilities. In Bedford, England, there is a part of the college entirely devoted to the provision of educational opportunities for the retired citizen. This place has a dynamic and stimulating approach.

Diet is important, especially among the socially deprived, and surveys in the West of Scotland have revealed deficiencies in the intake of iron, potassium, and vitamins C and D. Nevertheless, food faddism can make life a nightmare. It is almost impossible to change dietetic habits in the elderly. The following is an extract from a letter to the *Daily Telegraph* of 16 June, 1984, headed 'STILL GOING STRONG': "Sir, I note from your report (June 11), Food the biggest killer, that a new book *The Food Scandal* says that the British eat far too much fat, sugar and salt and that our eating habits are the biggest single cause of death. My husband enjoys liberal helpings of butter on white bread, at least 10 cups of tea a day with two large teaspoons of sugar in each cup,

sprinkles sugar on fruit pies, takes salt vegetables and roast potatoes cooked in dripping. Now in his 92nd year, he rises at 6 a.m. to cook my breakfast and always enjoys good health." In spite of these sentiments, sensible and practical dietetic recommendations are essential and animal fat, excess of tea or coffee, large amounts of carbohydrates, and dependence on alcohol should be avoided while increased intake of fiber usually is helpful. The eminent dietitian E.P. Cathcart wrote, "Eat all good nature doth bestow, it will amalgamate below if the mind says it shall be so." In other words, commonsense rules.

Old age is an attitude of mind; a little boy of four suffered from insomnia and his mother asked him what he thought about when he lay awake. He replied, "I think about my past life."

If there is any lesson to be learned from these random thoughts, it is the immense need of older people for love and affection. In this they are no different from younger people, but all too often they are categorized as being different. If you look at the conditions under which some of the elderly are living either at home or in some institution and if you say to yourself, "Is this satisfactory for me?" if the answer is NO, then try and do something about it. In my country the visitor from Mars would sometimes wonder if our priorities were correct. There is a verse written on a signpost on the way to Brighton which I think should be written above every door leading to accommodation of any kind for older people. It is as follows:

Hail guest, we know not whence thou art,
If friend we greet thee hand on heart,
If foe, then such no longer be,
We hope our love will conquer thee.

Rodel, Moor Road
Strathblane
Glasgow G63 9EX
Scotland

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Reminiscences of an American Pioneer in Experimental Medicine

MECHANICAL apparatus has so entered into the practice of medicine that sometimes I have thought that doctors ought to be called mechanics. I believe the trained fingers of the older doctors often could read more truly the indications of the pulse than does the modern scientific physician with the aid of his instruments of precision.

Horatio C Wood, M.D., "Reminiscences of an American Pioneer in Experimental Medicine," *Transactions and Studies of the College of Physicians of Philadelphia* (1920), page 15

Concerning Osler and Agnew
A Note on Historical Discrepencies

ROBERT AUSTRIAN

SUMMARY: Events are perceived differently by different observers. This fact is highlighted by the discrepant and amusing accounts of several encounters between William Osler and D. Hayes Agnew during the former's brief sojourn in Philadelphia.

HAVING passed Weir Mitchell's test on the disposition of cherry pits at the dinner table in London the summer before, an unwed William Osler came to Philadelphia in October, 1884, and took up residence shortly thereafter at 131 South 15th Street, the present site of the Union League Club.[1]

Soon after his arrival in Philadelphia in October of 1884, William Osler received an invitation from Dr. D. Hayes Agnew to attend Sunday services with him at the Second Presbyterian Church. Agnew, aged 66 at the time and one of Philadelphia's leading surgeons, had had an interesting career.[2] Born in Lancaster County, Pennsylvania, he was the only child of a physician. Agnew enrolled in the Medical Department of the University of Pennsylvania in 1836 and received his medical degree in 1838. For a time after graduation, he practiced medicine with his father in Nobleville, Pennsylvania; and between 1843 and 1846 he devoted a major portion of his energies to a family iron foundry which subsequently failed. Relieved of this diversionary activity, Agnew renewed his interest in medicine by dissecting bodies sent to him from Philadelphia. His practice of placing the bones of cadavers in a nearby pond where the remaining adherent soft tissue was removed by eels caused some consternation when the local residents who ate fish from the pond discovered what was taking place.

In 1848 Agnew moved to Philadelphia, where he spent the remainder of his life. From 1852 to 1862 he ran the Philadelphia School of

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Anatomy and obtained experience of undoubted crucial importance to his subsequent development as a surgeon. He received an appointment to the faculty of the University of Pennsylvania as Demonstrator of Anatomy and Lecturer in Clinical Surgery in 1863, and eight years later he was named Professor of Surgery at the same school, a post held till his retirement.

In addition to his teaching commitment, Agnew had a large and successful practice. Among his patients was the President of the United States. On July 2, 1881, James A. Garfield was shot in the back by a deranged Charles J. Guiteau. Agnew was called to Washington at midnight on July 3, and made the 135-mile trip from Philadelphia to Washington in 171 minutes on a special train. The President, who had recovered from shock by then, was seen by several physicians, including Agnew, among whom it was agreed that surgical intervention was contraindicated. Despite temporary initial improvement in the President's condition, he failed to recover fully; and his illness ran a protracted course over the next two months, the result of smoldering infection which ultimately seemed to disseminate and lead to his demise. For his professional services, Agnew received $5,000 from the Congress after he had declined to submit a bill.

Among the attributes for which Agnew was noted was his unusual piety. According to D. F. Willard: "He never operated on the Sabbath except in accident cases. On one occasion he astonished one of the younger members of the profession with whom it became necessary to make a trip into the country on a Sunday by fixing the hour at 6 A.M. It is almost unnecessary to say that he returned in time to be in his accustomed pew."[3] So it was when William Osler arrived at the Second Presbyterian Church in the autumn of 1884. I have discovered two versions of this episode early in Osler's five-year sojourn in Philadelphia: one by Osler's biographer, Harvey Cushing, the other by George Dock, Osler's resident in Philadelphia and later Professor of Medicine at the University of Michigan, Tulane, and Washington University in St. Louis. According to the former's account:

> Though his advent had been much heralded, little was known about him, as is evident from a story told of old Dr. D. H. Agnew, a devout person of Scotch-Irish ancestry, who wrote and asked if Dr. and Mrs. Osler would not share his pew in the Second Presbyterian Church the following Sunday. When Osler was ushered in unaccompanied, Agnew whispered regrets that he was alone, whereupon Osler's mischievous half

> got the better of him. He merely raised his eyebrows and finger, which was interpreted by Agnew—and circulated—that the new-comer's wife was "expecting."[1]

By contrast, Dock recounts:

> In the medical school and also among the staff of Jefferson Medical College and the profession in general, as well as among clever and well informed men of every line of activity, Osler at once showed his unusual capacity for making friends and admirers, and his attraction for bright and inquiring minds. Although he sometimes spoke of his shyness, he was always cordial and unassuming. To a prominent woman who asked him whether he called it Osler or Ossler, he replied: "I will answer to Hi! or to any loud cry." His irrepressible playfulness was shown the first Sunday after he arrived when Dr. D. Hayes Agnew, the most pious and venerable member of the faculty, asked him to church, which Osler of course accepted. On arriving in the pew Dr. Agnew asked him why he did not bring Mrs. Osler. "Mrs. Osler is a Buddhist and would not come" was the startling reply.[4]

Four years later, according to Cushing, Osler was to be concerned once again with Agnew, for 1888 marked the fiftieth anniversary of the latter's receipt of a diploma from the Medical Department of the University of Pennsylvania. Cushing's biography states: "So it was he [Osler], rather than some Philadelphian of longer standing, who is found on a committee with James Tyson, J. William White and a student representative of each class, preparing to celebrate the fiftieth anniversary of D. Hayes Agnew's graduation in medicine—a form of jubilee much more common in continental than American faculties. Agnew, then nearing the end of his indefatigable career, not only was a surgical colleague at Blockley and the Orthopedic Hospital but also held a chair at the University and well deserved the sort of tribute Osler had seen paid to Frerichs and Rokitansky and others during his sojourn in Europe."

To what event did Cushing refer? In Dr. J. Howe Adam's *History of the Life of D. Hayes Agnew, M.D., LL.D.,* a biography for which I can find no more appropriate word to characterize than "adoring", there is no mention of Osler in the detailed, 20-page chapter devoted to the "Jubilee of Dr. Agnew." According to Adam's account of the tribute paid Agnew by the medical profession and to the documents in a remarkable and unique scrap-book in the library of the College of

Physicians of Philadelphia[5], the gala affair held at the Academy of Music on April 6 was organized by a committee of eight that was chaired by S. Weir Mitchell and did not include Osler. Neither did the Committee of Arrangements, numbering twelve and headed by J. M. DaCosta. The only reference to Osler that I found was in the diagram of the seating for the dinner. The subscription price was twelve dollars, of which two dollars was to defray the cost of a portrait for the college; the remainder was for the nine course meal with five wines, brandy and cigars.

LITTLE NECK CLAMS
HAUT SAUTERNES

CALF'S HEAD SOUP
AMONTILLADO

HOT LOBSTER
RUDESHEIMER

CHICKEN CUTLETS. WHITE SAUCE

POTATO CROQUETTES FRENCH PEAS.
POMMERY SEC.
VEUVE CLIQUOT YELLOW LABEL.

ROMAN PUNCH

SWEETBREAD PÂTÉ

TERRAPIN
CHATEAU LATOUR.

TOMATO MAYONNAISE.

GORGONZOLA NEUFCHATEL

ICE CREAM

FRUIT.

COFFEE.
COGNAC.

Figure 1. Menu from dinner for Dr. D. Hayes Agnew held at the Academy of Music, April 6, 1888 (Courtesy of the College of Physicians of Philadelphia Library).

The absence of any reference to Osler's participation in planning the celebration led to a further search for the basis of Cushing's statement. At the end of Adam's chapter on "The Jubilee of Dr. Agnew," there is brief mention of another celebration of the fiftieth anniversary of his graduation by the Medical Department of the University of Pennsylvania held on April 24, 1888. The scrap-book of J. William White for that year (in the University's Archives) contains a circular letter dated March 1 and signed by Tyson, Osler, White, and a representative of each of the three medical classes. It proposes a gathering to be held at the University's Chapel on April 24, to be followed by a supper; the subscription price was fixed at three dollars. It is this event to which Cushing makes reference. His implied neglect of Agnew by the local profession seems to me somewhat misleading, for the affair which Osler helped to organize clearly followed that arranged by the physicians of Philadelphia and was, in a sense, more provincial in its scope.

The year 1888 not only saw the celebration of Agnew's jubilee but also brought word of the impending resignations of both Osler and Agnew from the faculty of the University of Pennsylvania. On October 18, Osler wrote a brief note to Provost William Pepper (a holograph copy is in the University's Archives):

> I hereby tender my resignation of the Chair of Clinical Medicine in the Medical Faculty.
>
> Very truly yours
> Wm Osler

One week later, Pepper received this letter from Agnew:

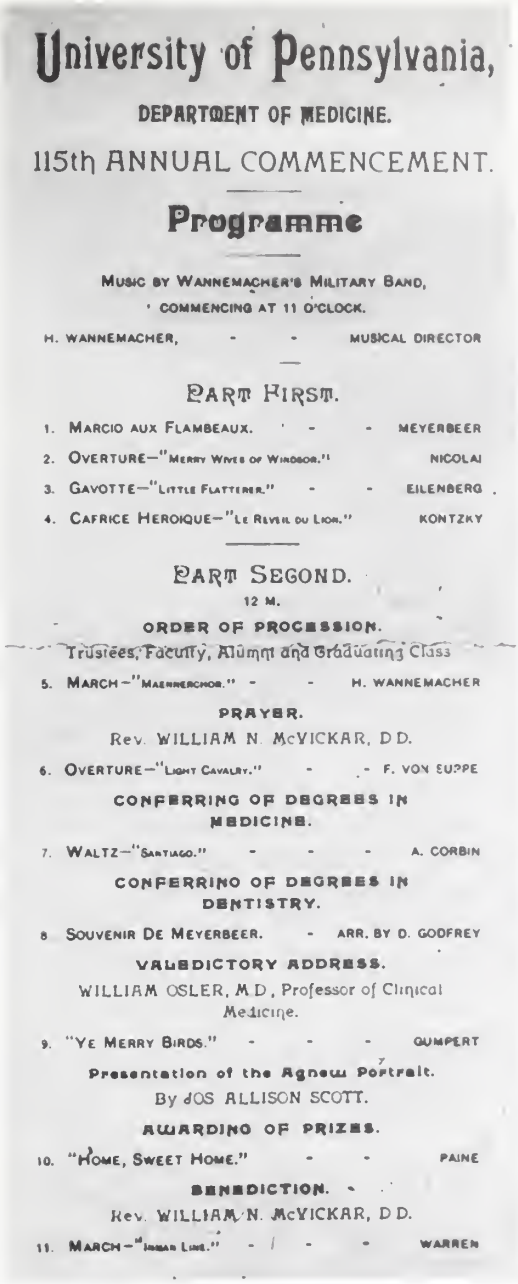
> My Dear Doctor-
>
> At the termination of the present term I propose to withdraw from the Chair of Surgery, in the medical department of the University, and consequently deem it proper to communicate to you at this early period, my intentions, even before sending my resignation to the Board of Trustees.
>
> When a man passes his seventy first year his future is filled with so many (contingencies[?]) that I do not think it proper that he should jeopardize the welfare of a great institution by longer continuing to hold so important a chair as that of surgery.

> In taking the above step, one of the most delightful thoughts which enters my mind is the fact, that during my connexion with the University, not a single event has occurred to disturb the most cordial relations between the members of the faculty and myself.
>
> Very respectfully your friend
> D Hayes Agnew

The foregoing communication preceeded by a month Agnew's formal letter of resignation, dated November 29, 1888.

Osler and Agnew were destined to meet formally one last time as members of the faculty of the Department of Medicine at its 115th Annual Commencement, held at the Academy of Music on Wednesday, May 1, 1889, with music provided by Wannemacher's Military Band. The occasion was a notable one in the lives of both men. The Valedictory Address, given by Osler, was his memorable essay "Aequinimitas." It was followed by presentation to the University of Thomas Eakins' famous portrait of Agnew, known now as *The Agnew Clinic.* The events of the day were recorded in *The Evening Telegraph*:

> The next event on the programme was the presentation of a portrait of Dr. Agnew to the University by the three classes of the Medical Department. Dr. Joseph Allison Scott, of the graduating class, in a few appropriate words made the presentation. "This is our Agnew Day," he said, "and well may we be deeply impressed by its solemnity, for it is the last time we shall see our beloved Professor before us in his official capacity." At a sign from Dr. Scott the veil was slipped from the portrait, showing a life-size likeness of Dr. Agnew, standing in the midst of his students and demonstrating to them an operation. All the figures in the group were taken from life. To the right of Dr. Agnew, in the foreground of the picture is seen Dr. J. William White, with forceps and scalpel, performing the operation in a case of cancer of the breast, assisted by Drs. Kirby and J. Leidy, Jr., resident physicians of the University Hospital. Grouped above these on the terraced seats of the clinic room, the faces of Messrs. Adams, Davis, Lincoln, Woodward, Toulmin, Tunis, Posey, Scott and Keifer can be recognized. The painting is 7 x 11 feet, without the frame. The artist was Mr. Thomas Aiken [*sic*].
>
> The portrait was received on behalf of the trustees by Dr. S. Weir Mitchell, Chairman of the Trustees' Medical Committee. Dr. Mitchell said that he had been advised of the office devolving upon him but an hour before, else he should have prepared a sermon more worthy of such a noble text. He thanked the students for presenting such a magnificant gift to their Alma Mater, and said that those who had listened to Dr. Agnew's words for three years saw his portrait not only on the canvas



University of Pennsylvania,

DEPARTMENT OF MEDICINE.

115th ANNUAL COMMENCEMENT.

Programme

MUSIC BY WANNEMACHER'S MILITARY BAND,
COMMENCING AT 11 O'CLOCK.

H. WANNEMACHER, - - MUSICAL DIRECTOR

PART FIRST.

1. MARCIO AUX FLAMBEAUX. - - MEYERBEER
2. OVERTURE—"MERRY WIVES OF WINDSOR." NICOLAI
3. GAVOTTE—"LITTLE FLATTERER." - - EILENBERG
4. CAPRICE HEROIQUE—"LE REVEIL DU LION." KONTZKY

PART SECOND.

12 M.

ORDER OF PROCESSION.

Trustees, Faculty, Alumni and Graduating Class

5. MARCH—"MAENNERCHOR." - - H. WANNEMACHER

PRAYER.

Rev. WILLIAM N. McVICKAR, D.D.

6. OVERTURE—"LIGHT CAVALRY." - - F. VON SUPPE

CONFERRING OF DEGREES IN MEDICINE.

7. WALTZ—"SANTIAGO." - - - A. CORBIN

CONFERRING OF DEGREES IN DENTISTRY.

8. SOUVENIR DE MEYERBEER. - ARR. BY D. GODFREY

VALEDICTORY ADDRESS.

WILLIAM OSLER, M.D., Professor of Clinical Medicine.

9. "YE MERRY BIRDS." - - - GUMPERT

Presentation of the Agnew Portrait.

By JOS. ALLISON SCOTT.

AWARDING OF PRIZES.

10. "HOME, SWEET HOME." - - PAINE

BENEDICTION.

Rev. WILLIAM N. McVICKAR, D.D.

11. MARCH—"INDIAN LINE." - - - WARREN

Figure 2. Program from the 115th Annual Commencement of the University of Pennsylvania Department of Medicine held at the Academy of Music, May 1, 1889 (Courtesy of the Archives of the University of Pennsylvania).

> before them, but had it hung in the gallery of their hearts. "And when you are plunged into the difficulties and trials of professional life, think what this man has done, and try at least to do the same. What a model for a physician to copy after; clear of brain, tender of heart, resolute of hand, firm of conscience. Whenever you become involved in doubt and uncertainty, think what Dr. Agnew would have done, and you will be sure to do the right thing." When Dr. Mitchell sat down there was a loud call of "Agnew" from all parts of the house. The venerable surgeon had taken his seat to the left of Dr. Pepper, and, in response to the call, he slowly rose and stepped to the front of the stage. This was the signal for a universal burst of applause and deafening clapping of hands. Probably at none of the University's 114 previous commencements has there been such an exhibition of enthusiasm and excitement. When the noise had subsided Dr. Agnew turned smilingly to his counterpart in oil and said that, though he had often heard of speaking likenesses, this did not hold in the present instance, and so he would have to do the speaking himself. "You have all heard," he said, "of the woman who wanted to be free from all trouble and turmoil of this life and accordingly built for herself a palace fitted out with every modern luxury and elegance. But she soon became so tired of her comforts that she went back into her old kitchen to smell grease. If, now that I have retired into comparative ease, life becomes unbearable to me, I shall still have the consolation of going across the river to hear the boys yell." At this, Dr. Agnew "heard the boys yell" where he stood and such was the din that he was unable to proceed for several minutes. When the "Meds" had quieted down he addressed a few words of earnest advice and exhortation to them and was just returning to his chair when he was overcome with emotion and fell back into the arms of Dr. McVickar. He recovered himself immediately, and before Dr. Pepper could go on with the programme, he again rose and, turning to the students, said in a firm and distinct voice, "I wish you all success in your profession."[6]

Writing of this episode, Adams makes the only reference to Osler that I have found in his biography of Agnew. Of the latter he writes:

> He had been suffering all the morning from a very acute attack of indigestion, which brought on a considerable amount of dizziness. This with the glare and heat of the foot-lights over which he was standing, the moving sea of upturned faces, and possibly, with some natural emotion under the circumstances caused this momentary indisposition. It gave the students a chance to study that imperturbability of manner under the most startling circumstances which Professor William Osler, in the valedictory address a few minutes before, had declared so necessary in the young physician.[2]

In this fashion, two notable figures in the history of American medicine bade their farewells to the University of Pennsylvania. It has been a source of interest and entertainment in reviewing the histories of these two prominent physicians to discover the discrepencies in the recounting of events in which their lives touched. It calls to mind the moral of "The Sheep in Wolf's Clothing," a fable by one this century's more perceptive authors, James Thurber:

Don't Get It Right, Just Get It Written[7]

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Reminiscences of an American Pioneer in Experimental Medicine

AT this time (1877) the Department of Medicine held its own commencement exercises at the Academy of Music. The "commencement" of the class of 1880 furnished the occasion of a noteworthy, albeit unruly, demonstration. The men of the College Department, never, at any period, friendly to the medical students and 'at outs' with the Provost (for what reason I do not know), gathered in numbers, strengthening their ranks from among their acquaintances, and filled the galleries and the available space in the amphitheatre. When the clergyman...rose to open the proceedings with prayer, these students broke out into all kinds of ribald shouts, hisses and groans, and finally drove the clergyman to his seat. The Provost then rose, but in his turn was forced to sit down. By this time the whole Academy was in confusion. I was sitting with the faculty on the platform, and my old preprofessional education in practical pacifism...suddenly shot up from the depths of my being in an overpowering impulse. Quickly throwing off my robes, jumping over the footlights into the aisle below, I said to the medical students sitting there, "Come boys, let's clean them out!" Instantly the whole body followed me. What exactly happened in the amphitheatre I cannot clearly remember, save only the tapping between the shoulders by myself of the last man who went almost headlong to the bottom of the stairs. The arrival of the police put an end to the riot and the proceedings continued with due propriety.

Horatio C Wood, M.D., "Reminiscences of an American Pioneer in Experimental Medicine," *Transactions and Studies of the College of Physicians of Philadelphia* (1920), page 20

Municipal Health Services in Philadelphia

STUART H. SHAPIRO AND HARRIET COHEN WILLIAMS

SUMMARY: Under the supervision of its Health Commissioner and four Deputies, and assisted by private agencies, Philadelphia's Department of Health maintains a broad program of service and education designed to benefit the physical and mental state of its citizens. Principal emphasis is on preventative medicine. The department's efforts have been challenged to a degree by a rising level of poverty, a declining and aging population, increasing non-white infant mortality and a disproportionate incidence among the non-whites of tuberculosis, homicide and cerebrovascular disease.

THE decade of the eighties is a time of exceptional challenge and promise for the American health care system. The resources for diagnosis and treatment of disease are increasing at a breathtaking pace. At the same time, millions of Americans are still facing major health problems which have not been ameliorated by advances in medical science. Many of these problems are related to poverty, the lack of access to health care, and unhealthy life-styles. The cost of health care services has been escalating most rapidly during these past few decades despite many attempts by both the public and private sectors to control health care costs.

The issues confronting the Philadelphia Department of Public Health mirror national concerns. Indeed, Philadelphia provides an excellent example of the strengths and weaknesses of the American health care system: although the resources for health services are plentiful in this city, there are also significant challenges to a healthy population.

Philadelphia's Department of Public Health provides a wide variety of services to city residents. Its overall charge, as stated in the City Charter, is to "protect the health of the citizens." The Department has interpreted this mandate broadly to include both individual health services and overall measures which assure the health of all citizens. Indeed, to be truly responsive to the health care needs of Philadelphians, the Department has many roles:

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1. The primary role of the Health Department is to *assure access* to health services.
2. The Health Department *provides* health services, either directly or indirectly by financing needed services.
3. The Health Department is a *regulator.*
4. The Health Department is a *coordinator/catalyst* among hospitals, neighborhood health centers, mental health centers, and individual physicians to improve the local system of health care.
5. The Health Department is an *educator,* teaching individuals about the importance of life-style to their own health, about the need for appropriate medical care, about the threats of nuclear war, etc.
6. The Department is an *advocate* for local government to assist the city in obtaining a reasonable share of health care dollars. The Department also *advocates* for a more equitable system of reimbursement for health services and a greater emphasis on health promotion.
7. The Health Department *monitors and analyzes* its activities, including tracking disease trends.
8. The Health Department does basic *research* into data analysis, health planning, and health policy.
9. The Department *communicates* actively with the public and the media to assure that there is full knowledge of its functions.

Organization of the Department of Public Health

To accomplish these many and varied functions, the Department was reorganized in 1981 to maximize efficiency and to promote needed integration among previously separate units. Under the direction of the Health Commissioner, there are four Deputy Commissioners who are responsible for those programs which provide individual health care services.

The Deputy Health Commissioner for Personal Health Services oversees four programs. They include: *Family Medical Care Services,* which provide primary care directly and specialty services on referral through nine city health centers. In 1983, 70,000 patients were registered in the Family Medical Care Program. The number of Philadelphians who use this program has increased steadily since its inception in 1969. *A Disease Prevention/Health Promotion* program brings together several areas of concern in public health, including disease surveillance and control, dental health treatment, maternal and child health programs, and the health program analysis unit, which publishes health status data and operates the management information and billing system for the city health centers. The *Office of Mental Health/Mental Retardation* provides comprehensive services through contracts with over sixty agencies in

Philadelphia. It offers case management, outpatient, partial hospitalization, emergency, vocational and social rehabilitation, interim care, early intervention, residential arrangements, and intermediate care. A *Coordinating Office for Drug and Alcohol Programs* offers education and prevention programs, residential, outpatient, and detoxification programs through contracts with agencies throughout the city.

The Deputy Health Commissioner for Specialized and Environmental Services oversees seven programs. The *Air Management Services* offer pollution monitoring and control and implementation of City Council's "Right to Know" Hazardous Materials Control Act. *Environmental Health Services* have broad regulatory functions, including rat and pest abatement, food protection, storage and disposal of hazardous substances, employee safety and health (including inspection of radiological equipment), lead poisoning control, and accident control. *Emergency Medical Services* offer a comprehensive program in conjunction with Philadelphia's Fire and Police Departments. *The Philadelphia Nursing Home* provides intermediate and skilled nursing care to approximately 500 residents. *Older Adult Services* operate four centers that provide social, recreational, and nutritional services to Philadelphians sixty years of age and older. *Prison Health Services* provide full health services to all prisoners in Philadelphia. The *Medical Examiner's Office* investigates all deaths that are not the result of natural causes.

The Deputy Commissioner for Support Services oversees the Department's facilities and directs the operations of the Pharmacy, the Public Health Laboratory, and the Personnel Office.

The Office of the Deputy Commissioner for Financial Management was created to centralize the fiscal activities of the Department in order to promote maximum efficiency. As the demand for program activities has expanded despite decreased government funding, prudent financial management and accountability have become departmental priorities.

Recently the Health Department has assumed responsibility for health services to city employees. The Compensation Clinic and Municipal Dispensary are being reorganized to improve health services to personnel from all city departments.

Health Status of Philadelphia

Philadelphia's health needs are many and varied. Its population is typical of older eastern cities, and in comparison with the state or the nation, the population is older, poorer, and less healthy. Between 1970

Table 1

Population by Age Groups—1970 & 1980

Age	1970	Percent Total	1980	Percent Total	Percent Change
0–4	158,634	(8.1)	108,202	(6.4)	–31.8
5–14	350,330	(18.0)	240,509	(14.2)	–31.3
15–24	319,449	(16.4)	313,497	(18.6)	–1.9
25–44	443,973	(22.8)	426,015	(25.2)	–4.0
45–64	450,686	(23.1)	362,617	(21.5)	–19.5
65–74	146,830	(7.5)	146,120	(8.7)	–0.5
75+	80,094	(4.1)	91,250	(5.4)	+13.9
Total	1,949,996		1,688,210		

and 1980, the total population declined by 13% to 1,688,210 in 1980. However, the number of residents who were seventy-five years and older increased by almost 14%. The birth rate dropped by 28% during the last decade (see Tables 1, 2, and 3).

Economic indicators show a pattern of increasing poverty in the city. In 1970, 15.4% of the population was below the poverty level; by 1980, the percentage had increased to 20.1%. During the same period, the percentage of persons at the poverty level declined nationally from 13.7% to 12.5% and in Pennsylvania the percentage of the population at the poverty level remained stable at 10.4%. In 1980, 339,330 Philadelphians were classified at the poverty level.

There are several major areas of concern in terms of the health status of Philadelphians. Conditions which have been linked to poverty are higher than state and national averages. Several indicators of the health

Table 2

Population by Race—1970 & 1980

Race	1970	Percent	1980	Percent	Percent Change
White	1,284,178	(65.9)	983,084	(58.2)	–23.4
Non-White	665,818	(34.1)	705,126	(41.8)	+5.9

Table 3

Percentage of Population
at Poverty Level

	1970	1980
Philadelphia	15.4%	20.1%
Pennsylvania	10.4%	10.4%
United States	13.7%	12.5%

status of the city's population differ from national patterns of continuing improvement and seem resistant to improvement despite advances in medical science.

A major public health concern is the city's infant mortality rate. Although the rate among whites in Philadelphia has decreased steadily over the last two decades and is now close to national and state averages, the infant mortality rate among non-whites is alarmingly high and has recently increased (see Figure 1). In fact, there appear to be two separate trends occuring in infant mortality in the city. Among whites, improvements in medical science are reflected in improved mortality

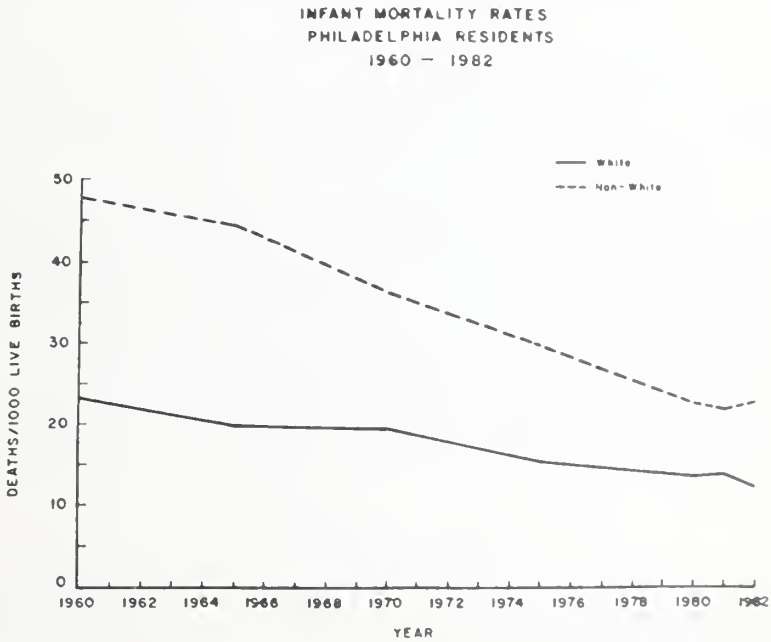

Figure 1. Although the rate of infant mortality among whites in Philadelphia has decreased steadily over the past two decades, the rate of infant mortality among non-whites is alarmingly high and has recently increased.

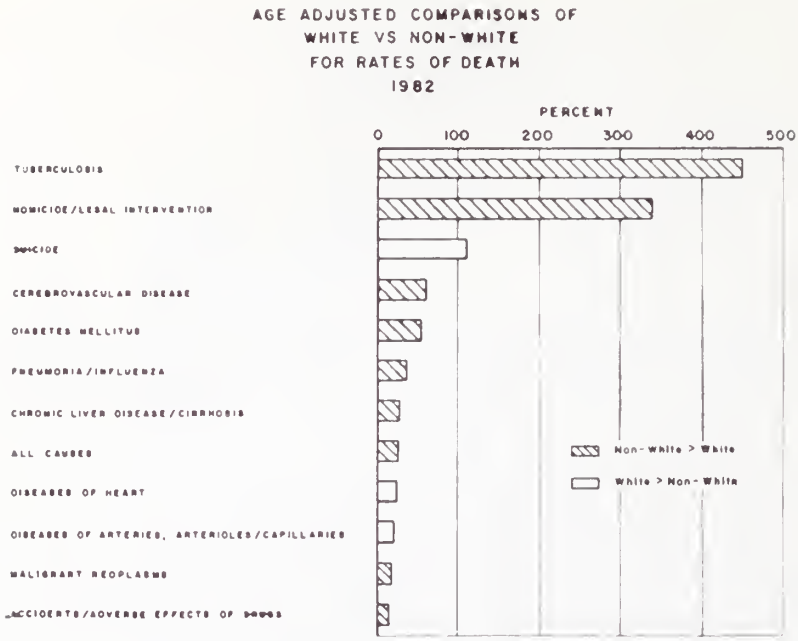

Figure 2. There are significant differences between the mortality rates for whites and non-whites in many causes of death.

rates. However, among non-whites, a very different pattern has emerged. The infant mortality rate among non-whites in 1982 was equivalent to the white infant mortality rate in 1960.

For many other major causes of death there are also significant differences between whites and non-whites (see Figure 2). For instance, in 1982 the mortality rate from tuberculosis was 439% higher among non-whites than among whites; the mortality rate from homocide was 325% higher among non-whites, and the mortality rate from cerebrovascular disease was approximately 60% higher among non-whites. Indeed, among the leading causes of death, only suicide shows a significantly higher death rate among whites.

Major Programs

The Department of Public Health provides services and resources which are directed, in partnership with private health services, towards major health problems. These services do not compete with private sector initiatives; rather, the Department works cooperatively with

providers and institutions. A significant portion of the clients of Department of Public Health programs are poor and/or uninsured. Public health services reduce the financial burden of the private sector.

The Department of Public Health has concentrated on prevention. There are both economic and moral imperatives for preventing serious illness or disability, and the Department offers primary care aimed at preventing serious illness. The health status data described in the previous section demonstrates a clear need for primary care, especially for poor and minority residents.

One of the department's most important initiatives is the Family Medical Care Program. Family Medical Care Services provide full primary care at eight locations. At each site the medical staff includes board-certified or board-eligible physicians in internal medicine, pediatrics, family practice, and gynecology. Specialty services and hospitalization are available upon referral from the primary care practitioner. Patients are registered in the program and assigned a primary care team which includes a physician, a nurse, and a clerk for continuity of care.

Although insurance payments are collected, no patient is barred from care because of financial barriers. During the past year, the number of uninsured patients has risen at least in part because of increasing eligibility requirements for public assistance by the Pennsylvania Department of Welfare. During the first six months of Fiscal Year 1984 (as compared to Fiscal Year 1983), there has been a one-third increase in the number of first-time patients who list themselves as "self-pay" rather than eligible for any third party coverage.

Another major program in the Health Department is the Maternity and Infant Care (MIC) Program. Pre-natal services are offered at twenty-six sites for poor, pregnant women. Numerous studies have demonstrated the importance of prenatal care to a successful birth outcome. This program is the Department's major initiative to improve Philadelphia's infant mortality rate. During the past year, approximately 10,000 women were enrolled in MIC. It offers medical prenatal care and nutritional, social service, and family planning information. The Department developed a publicity campaign to advertise the importance of prenatal care and the availability of services specifically targeted at pregnant teenagers.

These two programs are illustrative of the Department's efforts to provide primary care services in order to prevent serious illness among city residents. Many other programs have shared the same goal. However,

the Department also must be responsive to the priorities of other levels of government. In the area of mental health and mental retardation, state and federal mandates have dictated concentration on continuing care for de-institutionalized patients, rather than on prevention activities. The activities of Air Management Services and Environmental Health Services are also largely determined by state and federal priorities.

Public Health in the Eighties

In 1981, the Department of Public Health applied for and secured private foundation support to develop an ordered set of priorities for public health. During the past few decades, already multi-faceted public health departments in urban areas have taken on many new responsibilities, including development of community based mental health programs, expanded roles as health educators, provision of all levels of care for the poor, and public advocacy for enforcement of regulations protecting the environment. Often, the expansion of public health services has taken place not as a result of well thought out planning recommendations but rather in response to various political pressures. In addition, federal and state initiatives have become major determinants of city public health activities. Other functions of the public health department exist because of historical precedents, and not because these functions are most logically the tasks of a city public health department.

Using funds from the Robert Wood Johnson Foundation and the Commonwealth Fund, the Department undertook a thorough evaluation of its priorities and programs. These funds supported the work of a "Mayor's commission for Health Care in the 80's," composed of thirty-six influential and representative members of the community from industry, labor, academe, medicine, hospitals, and government. The Commission's charge was "to weigh objective, scientific evidence, economic data and the concerns and wishes of City residents and produced a well-substantiated and carefully considered set of recommendations of the methods by which Philadelphia can best serve the needs of its citizens." The commission utilized the work of eleven expert committees, each of which considered the literature of a specific area within health care in the development of its recommendations.

The Mayor's Commission has been the first step in a very difficult process, namely, public discussion of the relative merits of various

health care services. The Commission struggled with the task. It was obvious from the outset that all activities within public health, and in the rest of the health care system, have constituencies, and it has not been easy to decide which services are most worthy of the increasingly scarce and limited resources for health care.

The work of the Commission was difficult, since it found that good scientific data on the relative merits of various programs and procedures were not available. Although the Commission had hoped to perform its task based on solid research, they have had to function amidst shifting realities. Thus, the process became, in part, political—in the most positive sense. Given the paucity of data, the Commission functioned by building collective judgements based on economic and social factors and on political feasibility.

Although the hoped-for scientific data on the efficacy and effectiveness of health care services did not exist, there have been very positive outcomes from the Commission. Overall, the Commission ranked prevention efforts highest among its priorities. Even though the curative medical care system was well represented, and with full appreciation of the many needs of Philadelphia's health care system, preventive measures led the Commission's list of priorities.

The top ten priority recommendations give clear direction to the Health Department—go back to basics and emphasize prevention efforts. This will reduce health problems.

The Department welcomes cooperative ventures with the private health care sector which will improve the ability to offer primary prevention services to Philadelphians, and the Department welcomes this opportunity to give the readers of this prestigious journal a brief overview of the Department of Public Health and its goals and objectives.

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The College of Physicians of Philadelphia

PORTRAIT CATALOGUE

THE College of Physicians of Philadelphia, established in 1787, is one of the oldest medical organizations in the United States. Its founders were leading members of the American medical profession in the eighteenth century; among them were John Morgan, Benjamin Rush, and Adam Kuhn. The College was from its inception a professional society modeled along the lines of the Royal College of Physicians in London. For nearly two hundred years it has been a complement to the medical schools in Philadelphia.

The 214 portraits of noted scientists and physicians documented in this catalogue are intimately connected with the history of the College. Represented are all of the oil paintings, statuary, and non-medallic bas-reliefs; most of the framed silhouettes and original drawings in charcoal, pastel, and crayon are also included. Among the subjects are Aesculapius, David Hayes Agnew, William Harvey, John Hunter, William Williams Keen, Joseph Leidy, Silas Weir Mitchell, Philip Syng Physick, Benjamin Rush, William Shippen, Caspar Wistar, and medical members of the Atlee, Gross, Norris, Packard, and Wood families. Well-known artists include Thomas Eakins, Erwin Frank Faber, Daniel Garber, Robert Tait McKenzie, Samuel Aloysius Murray, Charles Willson and Rembrandt Peale, William Rush, John Singer Sargent, Thomas Sully, and James Longacre Wood. Written by Julie S. Berkowitz, each entry of the book contains biographies of both subject and artist and technical information about the work (including details of acquisition). There are 214 half-tone illustrations and one in color.

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Doctors and Credentials—The Roots of Uncertainty

CHARLES E. ROSENBERG

SUMMARY: Since 1870 the course of medical licensing in America has been complicated by a number of forces. Formal licencing and specialty certification have always followed rather than preceeded the trends the were meant to control. One notable reason for this has been the inconsistency between the profession's intellectual and institutional development.

IT was roughly a century ago that America's first effective medical licensing laws came—gradually and inconsistently—into being.[1] In some states, such as Illinois, a licensing program almost recognizable in modern terms already existed. By the First World War every state had passed a statute controlling access to the profession. In 1915 the National Board of Medical Examiners was organized and began to offer the first general, if still voluntary, nationwide certifying examination. Hospital and specialty certification were soon to become realities as well.[2] This has seemed to most historians a reasonable, if not in fact moral, and inevitable evolution—a necessary recognition of the social responsibility and intellectual superiority of properly trained physicians.[3]

Yet we have become increasingly aware that our system of granting credentials has not always worked well, seems always to need additional tinkering, and seems often to reflect past not present realities. Although the world of medicine a century ago was vastly different from that which concerns us today, the roots of contemporary problems were already apparent in the crude and tentative licensing system of the 1880s. The license to practice was a monolithic credential that failed to reflect existing divisions of skill and status within the profession; it was the

1. Remarks prepared for informal presentation at the summer meetings of the American Board of Internal Medicine, July 30–August 1, 1984.

2. The best account of these events is to be found in Rosemary Stevens, *American Medicine and the Public Interest* (New Haven: Yale University Press, 1971).

3. A more critical view expressed with increased energy in the past generation has tended to interpret both licensing and subsequent reforms in medical education as rooted in good measure in marketplace considerations. Both developments certainly had marketplace consequences, though this need not be seen as inconsistent with sincere desire to improve standards. Interest and principle seem often to coincide.

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product of exclusively cognitive and retrospective criteria. Licensing reflected, moreover, a decentralized and casual tradition of social administration. In the course of the past century we have seen the accumulation of more elaborate, more complex, yet in some ways still ambigious, procedures to institutionalize and certify clinical competence.

Until roughly the late 1870s and early 1880s, there had been no effective medical licensing in America.[4] Many of the individual colonies or states in the pre-bellum period did have licensing procedures of one sort or another, but none were effectively enforced. We had nothing comparable to French medical licensing, a centralized system begun in 1803. Of course, our educational and governmental systems are not in general centralized in the French manner. Any nation's style of organizing knowledge and professional services transcends in some ways the circumstances of any particular profession. National licensing policies, in fact, varied widely: Germany and England, for example, were both more liberal in allowing access to the practice of medicine than their French nineteenth-century contemporaries.[5] But America was certainly at the outer margin of informality—a situation exacerbated by the nation's federal structure. A mandatory national licensing system was hardly an option; to legal authorities it would have seemed inconsistent with a constitutionally appropriate division of powers.

Beginning essentially in the 1870's, a number of the states began to formulate licensure requirements. By the time of the Flexner report in 1910, every state had some sort of practice law on its statute books. Political realities, however,meant that licensing boards in the majority of states included sectarian practitioners—homeopaths and eclectics. This was an irreducible requirement of legislative politics; without sectarian support most licensing laws would have died in committee. This same period, ironically, also saw the great majority of states pass osteopathic practice laws.[6]

4. Samuel Baker has recently attempted to sort out the tangled history of modern licensing in the several states: "Physician Licensure Laws in the United States, 1865–1915," *J. Hist. Med.,* 39:173–97, 1984. For a more general treatment, see Richard H. Shryock, *Medical Licensing in America, 1650–1965* (Baltimore: The Johns Hopkins University Press, 1967).

5. Matthew Ramsey, "The Politics of Professional Monopoly in Nineteenth-Century Medicine: The French Model and its Rivals," in: Gerald L. Gieson, ed., *Professions and the French State, 1700–1900* (Philadelphia: University of Pennsylvania Press, 1984), pp. 225–305.

6. Norman Gevitz, *The D.O.'s. Osteopathic Medicine in America* (Baltimore: The Johns Hopkins University Press, 1982).

Despite our natural assumption that public willingness to grant a monopoly of practice to trained physicians reflected an awareness of their increasing technical skills and understanding of disease, the reality was rather more complicated. Laymen were certainly impressed by the discoveries of Koch and Pasteur and by the achievements of antiseptic surgery, but this did not mean they were ready to grant the regular profession an exclusive field of practice or to give their ideas an exclusive plausibility. Older loyalties to homeopathic and eclectic physicians and newer ones to osteopaths could seem equally reasonable.

Licensing masked an even more fundamental difficulty. This was the already well-established and rapidly increasing diversity within the *regular* profession. Medical practice had never been a competitive free-for-all—even in those decades when there had been no formal licensing. American medicine had been hierarchical since the end of the eighteenth century. Where America differed from most European countries was in the democratic assumptions that allowed every would-be practitioner to call himself "doctor." Americans created a linguistic fiction of medical equality—even if there was no practical equality in terms of practice, education, and access to institutional status.

Respectable, educated Americans on the whole consulted regularly-trained physicians; perhaps even more significantly, they consulted physicians very much like themselves. The wealthy, educated urban layman was treated by physicians of his or her own class—practitioners who constituted an elite in terms of social origin, training and manner. By 1875, there was already a well-marked *de facto* specialism within the profession.

Post-bellum American medicine was far from homogeneous. Even "respectable" medical school graduates had widely divergent skill, knowledge, and prestige. Every city was dominated by an elite of consultants who were the leading hospital physicians, who taught in the medical schools, and who enjoyed almost a monopoly of practice among their community's wealthiest families. These same practitioners dominated the early specialty societies and wrote the profession's textbooks and monographs. Such physicians, of course, were members of their local medical societies and were licensed where licensing procedures existed. But such formal credentials were not fundamental to defining their status; it depended not on what one was, but on who one was. Elite physicians were gentlemen and in many cases scholars—at least at the bedside and library. Similarly, the need to observe formal codes of

ethics was seen as being beneath the dignity of such prominent consultants. Morality, like learning, was assumed to be part of the gentleman physician's normal attributes.

But these were realities that hardly could be recognized in formal licensing. For one thing, the rank and file of general practitioners were already resentful of the profession's privileged elite. They regarded specialists as rivals for practice; they resented their domination of hospital attending and visiting posts and the fact that hospitals and dispensaries seemed to treat patients which general practitioners could have prescribed for on a paying basis. Thus cultural tradition and political pragmatism guaranteed that licensing would proceed on a one-dimensional, monolithic, yet administratively-decentralized, basis—even when such a picture of the profession was already inconsistent with professional realities.

The legislative politics were complicated and diverse, yet licensing became a reality in state after state and in time was to strengthen the hand of regular practitioners and would-be reformers of medical education. It was one factor helping to limit the numbers of practitioners in a once forbiddingly competitive market-place. Economics as well as idealism helped motivate the movement for state licensure.

Despite such diversity of motives and multiplicity of jurisdictions, the continuing dilemmas of medical accreditation were everywhere discernible a century ago. One problem was the inconsistency between the profession's intellectual structure and the institutional means devised to recognize that structure. Another was the decentralized nature of American society that made medical care planning well-nigh impossible—and that made certification, itself, a reflexive response to well-established realities. A final theme was the exclusively cognitive and retrospective aspect of licensing tests.

To an outsider, America's traditionally decentralized pattern of licensure (and intellectual life in general) is particularly striking. Every state, for example, had to have a different licensing law, even if legislators looked over their shoulder at statutes already adopted. There was no formal national policy for medical education nor were there national standards for medical graduates, let alone policies regarding the regional and specialty distribution of physicians. It should come as no surprise that, as early as the first decade of the present century, some medical men were already bemoaning the diminishing supply of small-town and rural practitioners and predicting that the growing number of

would-be specialists threatened to leave ordinary Americans without access to competent general practitioners. The term "medical manpower" had not yet come into use, but contemporaries were well aware that unplanned and potentially dysfunctional changes were taking place in the aggregate decisions of a new generation of medical men.

This problem of a poor fit between *de facto* change and a lagging institutional response is one we have faced in every succeeding decade. A particularly egregious example was the mid-twentieth-century manpower shortfall that was to induce a large-scale immigration of foreign medical graduates, leading ultimately to a sense of crisis. One need not have been the most sophisticated planner to have anticipated this problem; in the short term, the situation may well have been tolerable (even beneficial to some institutions), but in retrospect it seems hardly to have been an ideal solution to medical care needs.

A characteristic of the twentieth-century certifying system—like the earlier licensing mechanisms it has supplemented and in some ways supplanted—is the way in which procedures of accreditation always lagged well behind the clinical reality they were created to control. The development of the hospital provides a number of relevant instances. Internships and residency programs, for example, came gradually into being in the late-nineteenth and early-twentieth centuries as a result of changing medical aspirations interacting with the needs of the hospitals. But it was not until the 1912–14 that the first tentative efforts to organize and accredit house officerships were made by the American Medical Association. Similarly, there were roughly five thousand general hospitals in the United States in 1910—but no means of inspecting, licensing, or accrediting them. It was not until 1913 that the American College of Surgeons began agitating the question of hospital standards and accreditation.

This brings us to the matter of specialism and credentials. As I have already emphasized, specialism as an intellectual activity and a practice pattern came into existence well before there was any thought of specialty licensing. Some of the specialty Societies (such as the opthalmological) were founded as early as the 1860's. But these were self-consciously elite groups that thought of themselves as fellow scholars in a particular discipline—not society's designated gatekeepers to practice. Some of the early specialty societies had continuing publication requirements or were drastically limited in numbers so as to maintain their intellectual exclusivity.

It was not until the period of the First World War that attempts were made to institute certifying procedures to identify those practitioners who were truly "excellent" by contemporary standards. The ophthalmologists pioneered board recognition in 1917, followed by the otolaryngologists in 1924. In the 1930's there was a wave of new certifying boards: obstetrics and gynecology in 1930, dermatology in 1932, psychiatry in 1934 and internal medicine in 1936, among others. The only wonder is the length of time it took for the institution to take hold considering how important board certification has since become in defining legitimate practice patterns and maintaining intraprofessional economic relationships.

The reforms in education and licensing that characterized the first decades of the present century by no means put an end to the profession's economic problems. Ironically, licensing created a legal principle that recognized all practitioners as in some sense equal—and the practical corollary that only the individual practitioner could appropriately judge the limits of his competence. Only civil liability and episodic humility tempered this unsettling reality. For example, one of the reasons advanced by the American College of Surgeons for organizing themselves was the problem of fee-splitting which the College portrayed as a great moral evil. Perhaps indeed fee-splitting could and did lead to abuse; but it might more instructively be seen as a natural response in a system that lacked both formal distinctions between different levels of physicians and clear referral guide-lines.

The other compelling argument used by the American College of Surgeons and subsequent specialty boards was the growing number of physicians practicing—or alleging to practice—specialties they were incompetent to pursue. The most dramatic instances of such misguided practice could be found in surgery and the surgical specialties, but similar instances of aggressive incompetence could be found in every area of practice. The unitary licensing system had not accurately reflected the profession's intellectual shape in the 1880's; with each succeeding decade it had become decreasingly able to impose order upon the actual world of medical practice.

There was, in short, an enormous lack of clarity in regard to roles, responsibilities and economic relationships within the early twentieth-century medical profession itself. In a general way, the formal certification of specialties has to be seen as a response to this formless state. Thus it has a rational basis in the sense of expressing a need for

institutional order and a moral basis in its recognition that some people are indeed more competent than others in an arena in which expectations and consequences are enormous.

It was not entirely an accident that the first effective state licensing laws were passed when medicine seemed to be attaining a new level of understanding. Perhaps the 1870s and 1880s did not produce the therapeutic tools advocates of scientific medicine might have liked, but this was a period when the germ theory was being elaborated and disseminated and when the traditional image of medicine seemed to be transforming itself.

This raises yet another irony implicit in the original pattern of licensing. The cognitive change which sanctioned effective licensing and specialty certification was also a reality to which existing institutional arrangements responded lethargically. New knowledge, in other words demanded appropriate ways of organizing education, certification, and practice—yet these adaptations were often slow in taking shape. Radiology provides a particularly apt example. This new technique was quickly, if not hastily, assimilated and adapted in clinical practice; Roentgen's discovery was widely reported in 1896 and by the turn of the century most ambitious general hospitals boasted an "x-ray outfit" of some sort. But some were operated by photographers, a few by physicians, and some by physicists. It was not at all clear what kinds of credentials should be demanded and what relationships were most appropriate among the person running the apparatus, the person reading the plate, the patient, and the hospital. It was not until 1934 that the American Board of Radiology came into being, and well after that battles to determine the proper economic relationship between hospitals and the radiologists who worked in them were still being fought.

In the years since World War II, we have evolved an increasingly centralized and interdependent medical system. The federal government has become pivotal in the building of hospitals, in the subvention of medical research and education, and in the provision of medical care. In this gradual bureaucratization of medicine, the profession has retained an extraordinary amount of influence—with the role of the certifying boards becoming proportionately significant. This is despite the formal reality that the specialty boards were and are private corporations without legal standing as a licensing agency. Funds for residency and fellowship programs, patterns of professional aspiration and institutional

constraints (such as the specification of board-certification in hospital staff appointment), have clothed the specialty boards with enormous practical, if informal, authority. Yet at no point has that significant function reflected systematic consideration of medical care options in terms of the several interests necessarily involved. The specialty boards have helped sort out relationships within the medical profession—but not between that profession and the society that patronizes and supports it. Even where an examination is carefully prepared and administered, certification remains an almost entirely retrospective and cognitive test. Meanwhile the pace of intellectual and technical change makes all institutional arrangements provisional. Certification remains as its crude state predecessor began a century ago, a central yet uncertain component of America's medical system.

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REVIEW

TOMES, NANCY. *A Generous Confidence—Thomas Story Kirkbride and the Art of Asylum-Keeping, 1840–1883.* Cambridge: University Press, 1984. 387 pp., illus. Price $39.50.

Reviewed by FRANCIS J. BRACELAND

IT is difficult to do justice to this excellent work for not only has the author fulfilled the avowed purpose given in the title, but in so doing has also given the reader a survey of the start and early history of mental hospitals in this country.

Many of the "lunatics", as they were called, were cared for in the Almshouse, but in Philadelphia some were housed in a separate wing of the main Pennsylvania Hospital until the asylum was built four miles from it and two miles outside of the city.

Thomas S. Kirkbride, a Quaker and a gentleman, a physician, was chosen to head the new venture. He was an outstanding man with a yen to someday be a Senior Surgeon, but he was weaned from that to be the first head of the asylum. Eventually he came to be regarded as the best superintendent of a mental institution in the country. He served as chief physician of the new institution from 1840 until his death in 1883.

The asylum was operated strictly as a medical facility from its beginning. The "cult of curability" was in vogue and it was believed that insanity would respond to proper treatment, which at that time consisted of bleeding, purges and emetics. Depressed individuals were treated with stimulants.

Albert Deutsch, a writer and critic of a generation ago, chronicled the rise of the mental hospital as a "triumph of enlighted values over the brutal ignorant tradition of the past." He praised Kirkbride, the most prominent psychiatrist of his day, but he faulted the asylum doctors in general for an obsessive attention to hospital administration.

The author states that the history of the Pennsylvania Hospital for the Insane can be read on two levels. (1) "A history of medical innovation, and as such it chronicles the rise and fall of 'moral

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treatment' as a therapeutic paradigm." (2) "It follows the evolution of American society writ small within the walls of one institution throughout the 19th century. Through the medium of institutional and individual biographies these two lives of history come together in an immediate and compelling way."

Kirkbride did little research or professional writing and what he did write was concerned with hospital construction, in which for a while, he was highly respected. Unfortunately in later years his star dimmed and some "young Turks" called his philosophy and procedures into question; yet many patients, families, and colleagues continued their high regard for him. He collected his share of paranoid patients who made life miserable for him with suits, bad publicity, and court appearances. Yet withal the writer agrees with those who spoke highly of him and writes that his approach to patient care was far superior to our own in one crucial respect—"the care of the chronically insane."

The term "Generous Sympathy" was used by Kirkbride's wife in "a touching obituary" upon his death in 1883. The author adds, "In our own time when the qualities Kirkbride brought to asylum practice are in short supply, his ability to sustain a generous sympathy with all who suffer still commands respect." As a former resident in Kirkbride's in the 1930's, and one who "walked its wards" this reviewer read the work with nostalgic feelings and a realization that the author had caught its spirit and did indeed do it justice. I recommend the book highly. It was carefully researched and is well written and the reader will not be disappointed in it.

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REVIEW

GROB, GERALD N. *Mental Illness and American Society, 1875–1940.* Princeton: Princeton University Press, 1983. 428 pp. Price $25.00.

Reviewed by GENEVRA ZIEGLER-DRISCOLL

SINCE the beginning of the nineteenth century American society has come full circle in its care of the mentally ill. During that period three cycles of institutional developments and reform have occurred, each beginning with great hopes and promise, flourishing briefly, but eventually falling into disrepute in the face of changing and unanticipated circumstances. In his first volume, *Mental Institutions in America. Social Policy to 1875,* Grob deals with the first cycle of moral treatment and creation of the asylum in the early nineteenth century. This second volume opens as the wave of optimism over the initial development of the institutional network to provide care and treatment of the mentally ill is beginning to wane. The dreams of the early American activists, Horace Mann and Dorothea Dix, were seemingly realized. An overwhelming majority of patients were now in public institutions. But the storm clouds were gathering. The theme of this book is the complex set of interrelationships involving patients, psychiatrists, the social setting, and political culture that led to a reversal of attitude toward mental hospitals from one of support to one of antipathy.

The author proposes that the most important, but least recognized, group involved in affecting institutional changes was that of the patients themselves. They helped, however, more than any other group to mold the nature of the hospitals. Perhaps one half of the maximum of 500 insane patients initially cared for in the asylums recovered in this pleasant and intimate milieu. For the other half, continued hospitalization assured their survival. As America moved into the twentieth century, a basic change in the population of the mental hospitals took place. Not only did admissions increase and institutions proliferate in an attempt to accommodate the mounting need, but the proportion of senile

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patients increased sharply, thus the roles of the institutions designed for different functions were altered. In turn, the role of the psychiatrist shifted from one of treatment to being primarily one of manager and custodian. Many of the patients with their underlying somatic pathology were not amenable to the known therapeutic methods. As crowding increased and various abuses in some institutions became publicized, public dissatisfaction mounted. A reform movement spearheaded by an ex-patient, Clifford Beers, presumably started as one to correct institutional abuses, but shifted its precepts to those of a mental hygiene movement. The emphasis upon mental health and prevention and the creation of psychopathic hospitals with out-patient and child guidance clinics seemed more appealing and promising. At the same time, the status of the dependent, chronically mentally ill patients did not change.

In Grob's review of the historical development of the American psychiatry he reminds psychiatrists of their origin in the institutional setting with those pioneers who represented one of the first medical specialties. They were optimistic in their ability to cure mental patients with humane treatment in their new asylums. In fact, their reported recovery rate would stand up well with present day results. As a group they enjoyed considerable prestige and commanded higher salaries than their medical peers—small wonder that they saw no advantage in accepting the invitation to join the newly organizing American Medical Organization in 1853. This rejection set a pattern of withdrawal from the mainstream of medicine which psychiatry later would come to regret. When medicine entered a more scientific era, the isolation only intensified as the psychiatrists' role became more custodial than therapeutic. Looking for new roles, they readily allied with the Mental Hygiene movement which provided an opportunity to work outside the institutions and set up out-patient clinics in psychopathic hospitals. These shifts, along with the introduction of new therapies, helped to move psychiatry closer to their medical colleagues. In a further attempt to establish their legitimacy, psychiatry courses were introduced into medical school curricula, and The Specialty Board of Psychiatry and Neurology was established in the pattern of other medical specialties. Edward A. Strecker and Earl D. Bond played significant roles in these advances. But, as Grob reiterates, all this progress in psychiatry failed to prevent chronicity or alter the care of the severely mentally ill in any fundamental way.

The emphasis on the psychiatrist-patient roles reflects the reviewer's bias, not the author's. Grob gives equal attention to the impact of the growth and development of the occupational groups concerned with the mentally ill. He also described how the shift of responsibility from local communities to the states, with respective changes in the sources and levels of funding, caused a subtle but significant change in mental institutions. Issues of control by public officials versus psychiatric autonomy created a dilemma not easily resolved. Again, throughout these struggles the care of the mentally ill for whatever cause did not significantly change.

The author devotes one chapter to the third cycle of reform which includes the Community Mental Health and "de-institutionalization" movements. This reviewer hopes that he will write a third volume to deal with this era in depth and style comparable to the other two.

Grob has succeeded in giving the reader an unbiased historical setting of the care of the mentally ill during the period from the late nineteenth century to the beginning of WW II. He has based his work on thorough research of printed and unpublished archival records, only a few of which he included in the footnotes placed unobtrusively at the end of the text. Throughout the book the author's concern and compassion for the mentally ill is apparent. In his concluding remarks he makes his one indictment on their behalf without placing the blame on any particular doorstep, stating that recognition of the need for care of the mentally ill "should have tempered the attack on the legitimacy of mental hospitals."

If the lessons of history can help us deal with issues facing us in the decades ahead, this study, as well as its predecessor, should be compulsory reading for all concerned with the care of the chronically mentally ill. Will we again advocate the asylum where they can be protected from psychological and physical harm and from the deleterious effects of their own illness?

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REVIEW

NRIAGU, JEROME O. *Lead and Lead Poisoning in Antiquity.* New York: John Wiley & Sons, 1983. 437 pages. Price $49.95

Reviewed by MICHAEL R. ZIMMERMAN

THE increasing concern with the effects of environmental lead on human growth and development, leading to the current Environmental Protective Agency proposal to ban leaded gasoline, makes a book on the antiquity of lead and lead poisoning particularly timely. Dr. Nriagu has produced an extensive review of virtually every aspect of ancient man's knowledge and use of the metal. Unfortunately, the result is a book that this reviewer found to be rather dull. (One must resist the temptation to describe a "leaden" writing style, etc.) Lead poisoning, the subject of most interest to the medical reader, is given equal billing in the title, but only the last 50 pages are devoted to the topic. The reader must first wade through 378 pages covering, in infinitesimal detail, the history of the metal, a task aggravated by the author's historico-classical orientation. The book opens with a discourse on nomenclature, covering the etymology of words for lead in many languages, ancient and modern, followed by a lengthy section on references to lead in literature and poetry. This chapter sets the tone for a book composed in great part of quoted passages that lend themselves to skimming rather than reading. The techniques of mining and metallurgy in all corners of the ancient world are covered in a similar fashion, followed by a catalogue, drawing extensively from ancient literary sources, of the distribution of lead and lead mines in antiquity.

The fourth chapter is on the production and use of lead, again in infinitesimal detail. The following example is taken from page 255: "A Roman bust of a Bacchante made of lead encased in bronze was found near Southampton. The eyes were of silver, the lips and nipples of copper, and the bust weighed exactly 8 Roman pounds, or about 2.35 kg (Hofmann, 1885)." Lead compounds, rating a separate chapter, are covered in the same fashion.

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It is not until Chapter 6 that the medical reader finds his or her area of interest: lead exposure and lead poisoning. Occupational and non-occupational exposure is detailed, and the ubiquity of lead in the ancient world is set forth, although the evidence is again literary rather than archaeologic. Ancient descriptions of possible lead poisoning are quoted at length, with the author properly noting that these could apply to other disorders.

The last part of the final chapter, dealing with lead poisoning and the fall of the Roman Empire, is the only area in the book in which lead levels in bone are considered. However, contradictions abound herein. Much is made of "The magnitude of the excess lead in the Romano-British skeletons . . . " (p. 405), but on the verso (p. 406), Nriagu states that "It is clearly fallacious to believe that the extent of exposure to lead was the same in both Rome and the provinces." The section depends heavily upon historical records of infertility and profligacy in linking lead-contaminated wine with social deterioration among the Roman aristocracy.

The book would have been much more readable had Chapters 1 through 5 been compressed into a single chapter, with synopses of the classical sources rather than quotations. I can recommend the book only to the devout antiquarian. Others interested in the subject of lead poisoning should read the last chapter in a library copy.

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REVIEW

RAPHAEL, BEVERLY. *The Anatomy of Bereavement.* New York: Basic Books, 1983. 440 pages. Price $27.50.

Reviewed by LAMONT R. SATTERLY

None of us grieve very well because no one knows how you're supposed to do it.

THESE words shared at a recent Philadelphia forum on Grief and Bereavement serve to illustrate the classic problem facing those professionals who work with the terminally ill and their families; namely that there is no "right" way to grieve.

Modern scholars have attempted to address the problem of bereavement care and, understandably, have been forced to resort to statistics and data gathering as the easiest approach. While such efforts deserve applause and have been well done for the most part, they are helpful mostly from a sociological perspective and do not lend themselves in a concrete manner to persons who daily work with the dying.

Beverly Raphael, an Austrian psychiatrist, in her book *The Anatomy of Bereavement* has undertaken a considerable task in attempting to go beyond the data base approach of bereavement care to teaching and interpretation in the field. Her research has been extensive as she clearly shows in her numerous references from the early writings of Freud (1917) through the reports of today's bereavement specialists such as Colin Murray Parkes, Glick, and others.

The author has worked hard to avoid the pitfalls of jargon and biased thinking to present a multi-sided picture of bereavement which takes into consideration each familial situation. Her chapter on the bereaved child and the impact of death on the family is one of the finest I have read. In it she dares to attempt to outline the manner in which family legacies affect grief and bereavement. Though brief, it is most helpful.

In the 440 pages in this book, Dr. Raphael ranges from a discussion of bonding in relationships, to defining bereavement and mourning,

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and examining varied reactions to death in children and adults of various ages. Each chapter is filled with superb examples and case studies which add to a reader's insight and make the book more absorbing.

This textbook is written for those who work with the terminally ill and their families. It would be a helpful reference for sociologists and therapists in general who need information about grief. For those who have neither the time nor the inclination to read extensively on the subject the book will supply information about bereavement helpful to clients, patients, or families. It is a must for hospice workers.

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REVIEW

CRAWFORD, JOHN S., and J. DONALD MORIN, eds. *The Eye in Childhood.* New York: Grune & Stratton, 1983. 616 pages, illus. Price $79.50

Reviewed by ROBERT D. REINECKE

PEDIATRICIANS have taught other doctors that children are not just little adults. Not only do children have a set of diseases and problems which are distinct from adults, but special examination techniques and treatment schedules can result in much better outcomes. Since the child has a long life expectancy, any improvement in morbidity becomes a significant factor, not only to medicine, the patient, and the family, but to all of society. Medical specialties have gradually allowed the same thinking to permeate their ranks. We now see pediatric psychiatrists, pediatric surgeons, pediatric urologists, pediatric neurologists, and pediatric ophthalmologists. The latter formed their own society about 10 years ago and have added to better care and awareness of the eye problems of children.

One of the leaders of pediatric ophthalmology has been Dr. John S. Crawford of the Hospital for Sick Children in Toronto, Ontario. As with many well-known leaders, he was doing the specialty work long before anyone thought it was important to call such a person a pediatric ophthalmologist. His experience in that institution has culminated in numerous observations and new techniques. Many have benefited from his writings, and he now adds a textbook to his many accomplishments.

This textbook is one of many multiauthored texts which have become popular today under the assumption that no one person can have all the knowledge to write authoritatively on a wide range of subjects necessary for a book such as this one, *The Eye in Childhood.* Perhaps one cannot, but this reviewer wishes that Dr. Crawford had done so. A textbook (to this reviewer) should be more than an encyclopedia; it should represent an approach to a discipline of medicine. All the details of the pathophysiology of disease need not be covered, but the author should be thorough in discussing the diagnosis and treatment of a disease. If more details are necessary, then appropriate

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references should be given in specific points in the text, not as general references at the end of the chapter, as is done in this book.

With the potential limitations of a multiauthored textbook, what are the advantages of this book of 27 chapters and 600 pages? The chapters on embryology and the diagrams throughout the book are first rate. Although a clinician would seldom have the need to review embryology, such chapters will be well received by the person trying to understand developmental abnormalities of the eye. The photographs and diagrams are of good quality throughout the book; however, the diagrams are of varying detail, depending on each author. The chapter on strabismus is particularly good, and this is to be expected, for it is authored by Dr. Crawford, whose specific area of expertise is this disorder. Nevertheless, I am disappointed that he is still recommending and describing the Hummelsheim procedure, which is generally in disrepute as a motility-enhancing operation for the globe. Dr. Crawford's chapter on plastic surgery of the eyelids of children is also first rate, with just the right amount of diagrammatic explanation.

What of the rest of the book? It justifies itself in its coverage. Had the book been closely edited to cross-index topics conveniently or to reposition them so that they be covered in detail in one section, the reader would have been helped. However, if the reader refers to the index for a topic (such as toxoplasmosis) and seeks out the other pages of coverage, the answers to most questions will be found. The authors should be commended for limiting the book to 600 pages, and further editing could have made it an even better book.

This volume has some tough competition. Duane's *Clinical Ophthalmology* is encyclopedic,[1] but it covers much of the same material as does Harley's *Pediatric Ophthalmology*.[2] Harley's book is almost overwhelming in its encyclopedic qualities. Crawford's book would seem to satisfy many uses, and I would predict that it will be around for a long time. General ophthalmologists will like it, but most pediatricians may find that it tells them more than they wish to know. The book is a must for any well-rounded medical library.

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1. Duane, Thomas D., ed., *Clinical Ophthalmology* (Philadelphia: J.B. Lippincott, 1983).
2. Harley, Robison D., ed., *Pediatric Ophthalmology,* 2nd ed. (Philadelphia: W.B. Saunders Co., 1983).

REVIEW

THE CERVICAL SPINE RESEARCH SOCIETY. *The Cervical Spine.* Philadelphia: J.B. Lippincott, 1983. 544 pages, illus. Price $62.50

Reviewed by HOWARD H. STEEL

HERE is a textbook so comprehensive, complete, and excellently edited that it can be recommended not only for orthopedic residents in training but also for those such as orthopedic surgeons and neurosurgeons who are engaged in the treatment of the cervical spine. In addition, because of the chapters on the radiological findings in the cervical spine, this volume seems to me to be essential to those dealing with X-rays of this area.

The editors have somehow avoided the usual pitfalls that occur in a textbook with multiple authors. They have, moreover, marshalled the considerable talents of those trained in many disciplines, including anatomy, roentgenology, biomechanical engineering, orthopedic surgery, and neurosurgery.

The book contains 544 pages, well organized into chapters, and if one had to have any quarrel with the text, it would be that the authors' qualifications are not delineated on the title page. The illustrations and charts are well selected and successfully demonstrate examples of anatomy and pathology. The drawings that accompany the text are well executed and frequently are drawn from papers published in the literature that clarify difficult disease entities and techniques. Chapters are included that demonstrate the superior diagnostic measures available to the profession, such as bone scanning, selective arteriography, and CAT scanning enhanced by metrizamide myelography. It is somewhat unfortunate, however, that the text was published before the development of NMR, a technique which is, at the moment, the ultimate in noninvasive diagnostic imaging. One would wish that there were further exposition of the treatment (both surgical and conservative) of cervical arthritis and of the common problems of the whiplash injury.

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This well-referenced compendium is highly recommended for those dealing in the practice of cervical problems and those wishing to learn about this area of the human anatomy. It is also highly recommended as an excellent reference source for medical libraries.

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REVIEW

BOGGS, DANA R. and WINKELSTEIN, ALAN. *White Cell Manual—Edition 4.* Philadelphia: F.A. Davis Co., 1983. 109 pp., illus. Price $6.95 (paper).

Reviewed by EDWARD H. McGEHEE

THIS little book is filled with useful information. It can be recommended to all members of the clinical world as it covers a vast amount of knowledge accumulated in the last fifteen years—only two references of the seventy-five which were cited are for publications dated prior to 1970.

In their effort to reach medical students, Drs. Boggs and Winkelstein render difficult concepts readable to many who appreciate such simplification. White cell functions and their interrelationships are clearly listed. Diagrams are quite clearly presented to augment the reader's understanding.

Cell granule functions, pinocytosis, stem cell relationships to the various leukemias, T-lymphocytes and B-lymphocytes are succinctly differentiated and their relationships to disease states, neoplasms and genetic disorders convincingly presented. Dr. Winkelstein has condensed an enormous field of new data about immunological functions and diseases.

For those wishing deeper excursions into background and research information, the bibliography will be highly satisfying.

If you pick up *White Cell Manual* during your next trip to a medical library, *strong* odds are offered that you won't go home without ordering it.

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ACADEMIA

Items of Interest from Philadelphia Medical Centers

Hahnemann University. An affiliation with Bryn Mawr College will give undergraduates in non-scientific majors early assurance of admission to Hahnemann University's School of Medicine. Sophomore students who have taken three semesters of premedical courses may apply for admission after declaring a non-scientific major.

Medical College of Pennsylvania. An authority on cholesterol metabolism, *George H. Rothblat, Ph.D.*, has been appointed chairman of the department of physiology and biochemistry. *Andrew B. Beasley, Sc.D.* has been names professor of anatomy.

The hospital will share a grant of $15.6 million with four other Delaware Valley hospitals to establish an experimental program of prepaid medical care to Medicaid patients and private employer groups. The plan calls for Medicaid to repay physicians and hospitals for services at a fixed price at a rate of $500 to $1,000 annually for each patient who has exercised the right of free choice of physician. Others affiliated in the plan are St. Christopher's Hospital for Children, Temple University and Episcopal Hospital.

Martin Schimmel, M.D. has been elected president of the medical/dental staff.

Gerald J. Kelliher, Ph.D. has been appointed dean for medical education.

Philadelphia College of Osteopathic Medicine. In an address to the first and second year classes *Mayor W. Wilson Goode* celebrated National Osteopathic Medicine Week, September 16–22.

Temple University. *H. Branch Coslett, M.D.* has been given a grant by the National Institute of Neurology on Communicative Disorders and Stroke Council to support his studies of communication impairment caused by stroke or other brain injury.

With the cooperation of the Pennsylvania Department of Health and the Federal Maternal and Child Health Care Consolidated Program a unit has been established to evaluate the management of patients with cystic fibrosis who are now reaching adult years. The unit is directed by *Stanley Fiel, M.D.* with assistance from St. Christopher's Hospital and Georgetown University's Child Development Center.

A former senior staff fellow of the National Institutes of Health, *Jeffrey I. Greenstein, M.D.* has been given a Teacher-Investigator Development Award for investigation of cellular immunoregulation in multiple sclerosis.

Thomas Jefferson University Announcement has been made of the appointment of *Joseph M. Rogers, M.D.* to the post of associate dean of affiliations and residency program coordination.

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A grant has been received from the Kellogg Foundation to be administered by the Center for Research in Medical Education and Health Care. The grant is for a three year project designed for the use of disease staging to evaluate and improve hospital care. A principal aim is to define the extent of the late-stage-admission problem for selected diseases in a teaching center and a community hospital.

The new division of occupational and environmental medicine and toxicology of the department of medicine will be directed by *Lance L. Simpson, Ph.D.*

A program is under way to prepare students for practice in an age of high technology by instructing them in the operation and application of computers in medicine.

The Christine R. and Mary F. Lindback awards for Distinguished Teaching were presented this year to *Joye F. Jones, Ph.D.* and *Joseph F. Magdan, M.D.*

In recognition of his services to his specialty *Robert H. Bradley, Jr., M.D.* has been given the Distinguished Service Award of the American Urological Association.

Four students, one from each class, have been honored with a Gouley Award for their essays on the topic: "The Non-Medical Subjects I Should Know to Enable Me to Be an Effective Physician to My Patients."

Errata

The editor and Dr. Samuel X Radbill regret the errors in "'Dear Packard,' Francis Packard's Osler Connection," published in the September issue of *Transactions and Studies*. The corrections are listed here in a letter recently received from Dr. Packard's daughter.

Mrs Peyton R. Biddle
413 Eaton Way
West Chester, PA 19308

September 24th 1984

Dear Doctor McClenahan,

A friend lent me his copy of *Transactions and Studies* knowing I would be interested in reading "Dear Packard," by Samuel X Radbill. I was extremely interested and delighted to know that my small gift is useful. I only regret the inaccuracies found therein. My father's name was Francis R. (for Randolf), not H., and he married first Christine Curwen who died very shortly thereafter of a brain tumor. His second wife was Margaret Horstmann, the mother of his four daughters. Elisabeth Wood Packard was father's mother, her father was Charles Stewart Wood, not Horatio. George B. Wood was father's uncle, not his grandfather.

May I also point that Dr. Gross (Mrs. Osler's first husband), not Dr. Wood, was large instrumental in persuading Dr. Osler to leave Montreal and to accept the chair of Clinical Medicine at the University of Pennsylvania (quoted from Arnold Muirhead's "Grace Revere Osler, a brief Memoir"). Would you be kind enough to see that the above errata be corrected in the next issue.

Sorry to have had to bother you with this.

Sincerely,
Francis Packard Biddle

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